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CROSS-SECTORAL ISSUES, WITH PARTICULAR REFERENCE TO THE CRITICAL ELEMENTS OF SUSTAINABILITY

Note verbale dated 8 March 1996 from the Permanent Representative of Malaysia to the United Nations addressed to the Secretary-General

The Permanent Representative of Malaysia to the United Nations presents his compliments to the Secretary-General of the United Nations and has the honour to transmit herewith a report entitled "Agenda for Action - the Way Forward".

It would be highly appreciated if this report could be circulated as a document of the Commission on Sustainable Development at its fourth session.

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* E/CN.17/1996/1, to be issued.

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ANNEX

TOWARDS CORPORATE ENVIRONMENTAL EXCELLENCE -
Challenges & Opportunities In Asia-Pacific
Kuala Lumpur, 17th - 20th October, 1995

AGENDA FOR ACTION - THE WAY FORWARD

Organized by:

GLOBAL 500 FORUM

Golden Hope

In collaboration with:

Ministry Of Science, Technology And The Environment, Malaysia

UNEP

In conjunction with:

ASEAN ENVIRONMENT YEAR

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TOWARDS CORPORATE ENVIRONMENTAL EXCELLENCE - Challenges & Opportunities in Asia-Pacific

Recognising the need for business and industry to strengthen their role in promoting sustainable development, the Global 500 Forum and Golden Hope Plantations Berhad in collaboration with the Ministry of Science, Technology and the Environment, Malaysia and the United Nations Environment Programme (UNEP) organised the 1st Global 500 Forum International Conference themed "Towards Corporate Environmental Excellence - Challenges and Opportunities in Asia-Pacific". The conference was held in conjunction with ASEAN Environment Year, from 17th to 20th October, 1995 in Kuala Lumpur, Malaysia.

The objectives of the conference were:

- To promote the role of business in achieving sustainable development;
- To encourage the corporate sector to be proactive in addressing environmental challenges of common concern;
- To enhance business opportunities through green management policy and practices;
- To foster cooperation between business and the public for the betterment of the environment;
- To set an agenda for corporate environmental excellence.

The conference provided a platform for corporate leaders, entrepreneurs, policy makers, environmentalists and other stakeholders to identify and address challenges and opportunities towards corporate environmental excellence. It attracted the attendance of over 350 participants from 30 countries.

The Hon. Deputy Prime Minister of Malaysia, YAB Dato Seri Anwar Ibrahim officially opened the conference on Tuesday, 17th October, 1995. In his keynote address, he called for a paradigm of development characterised by a proper balance between three interrelated value systems: "value for money or economic justice, value for nature or environmental justice and value for people or social justice".

On the role of the private sector, particularly the large corporations, he reiterated that "they have an important and legitimate role in promoting both economic growth and environmentally sound and sustainable development. This is very much in tune with UNCED's Agenda 21, where business and industry, including transnational corporations, are expected to assume some responsibility in the social and economic development of a country. Business and industry should therefore recognize environmental management as being among the highest corporate priorities and as a key determinant to sustainable development".

In her message conveyed to the conference, Ms. Elizabeth Dowdeswell, Executive Director of UNEP stated that "this forum is an important convergence of the corporate industrial world with the environmental world. The two are often seen as being at odds, one characterized as being preoccupied with the maximization of profits within the short term, the other with the maximization of the diversity and quality of life in the long term. What we find, of course, is that we both live in one world, a world in which our two realms are not only interconnected, but interdependent".

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She stressed that sustainable development requires the energies and wisdom of industrialists and environmentalists alike and hoped that the "deliberations in Kuala Lumpur will point the way to a package of policies for our collective survival. It is a task that calls for dispassionate analysis and passionate commitment"

The 1st Global 500 Forum International Conference was designed to be different and to make a difference with regard to the state of the environment globally. The conference structure and programme was constructed in a manner that culminated in an Agenda for Action. This agenda which took into account the presentations and deliberations during the conference plenary and concurrent sessions and panel discussion, was presented by Sir Martin Holdgate, President, Global 500 Forum in the final plenary paper "Agenda for Action - The Way Forward".

It is hoped that business and industry, UN agencies, governments, non-governmental organisations and other stakeholders will adopt and implement the recommendations of the Agenda for Action as a way forward, for achieving both, corporate environmental excellence and sustainable development.

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AGENDA FOR ACTION - THE WAY FORWARD

Presented by

Sir Martin Holdgate
President, Global 500 Forum

INTRODUCTION

The 1st Global 500 Forum International Conference entitled "Towards Corporate Environmental Excellence - Challenges and Opportunities in Asia-Pacific" had five very clear objectives:

- to promote the role of business in achieving sustainable development;
- to encourage the corporate sector to be proactive in addressing environmental challenges of common concern;
- to enhance business opportunities through green management policy and practices;
- to foster cooperation between business and the public for the betterment of the environment;
- to set an agenda for corporate environmental excellence.

The Conference took as its point of departure three important basic assumptions. First, that all nations and all peoples need a paradigm for a just, equitable and sustainable development. Second, that this development cannot be created by governments alone, but requires the cooperative endeavour of all sectors of society. Third, that the world of business, industry and commerce has a central role in the building of sustainable development because it is the creator of wealth and the inventor and operator of the technology we need if industrial advances are to proceed without environmental destruction.

These assumptions are not new. They were endorsed by the Heads of State and Government at the UNCED Earth Summit in Rio de Janeiro in June 1992. They are rehearsed in Agenda 21. They have been repeated by many world leaders - and were a central part of the keynote address delivered to the conference by YAB Dato' Seri Anwar Ibrahim, Deputy Prime Minister of Malaysia and in the message sent to the Conference by Ms. Elizabeth Dowdeswell, Executive Director of UNEP. The central task of the Conference was to work out how they could be applied in the Asia Pacific context.

A number of general guiding principles have been made. These include the statement of responsibility for Government towards business and industry and for business and industry itself, set out in Agenda 21; the 16 Principles for Environmental Management in the International Chamber of Commerce's (ICC) Business Charter for Sustainable Development; the 9 approaches recommended to business leaders in the ASEAN Business Principles on Sustainable Development; and the concept of ecoefficiency advocated by the World Business

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Council for Sustainable Development. The latter made a key point in emphasising that companies that are environmentally efficient - that use energy and materials efficiently, minimize waste and do not pollute - are also likely to be economically efficient. It is (or would be) a fallacy that environmental protection adds costs. Often, when a Company applies its ingenuity, high environmental performance and profitability go hand in hand.

The ICC and ASEAN principles for sustainable development can be combined and grouped under three main headings:

(a) the development of a corporate policy for environmental excellence;

(b) the application of environmentally sound management and operational practices;

(c) the adoption of a wider role by business to promote sustainable development in the community.

These three headings have been used to structure this Agenda for Action emerging from the Global 500 Forum Conference in Kuala Lumpur.

The ICC/ASEAN principles suggest that corporate policy for environmental excellence should include:

(i) recognition by business of a moral responsibility to promote sustainable development;

(ii) commitment to environmental excellence throughout the enterprise;

(iii) expression of this commitment in a corporate environmental policy statement and plan of action.

In management and operational terms, the key principles can be re-arranged as:

(iv) promulgation of the corporate environmental plan throughout the enterprise, informing, training and involving employees in enhancing environmental performance;

(v) adoption of high safety and environmental protection measures in all plants;

(vi) promoting energy conservation and waste minimization in all operations;

(vii) adoption of life cycle assessment of products and services;

(viii) attention to the environmental standards of contractors and suppliers;

(ix) adoption of self-auditing and self-regulation.

As to the wider role, the principles indicate that business should:

(x) be proactive in advising Government on the economic and regulatory requirements that can best advance sustainable development;

(xi) publish their environmental strategies and reports on environmental performance and discuss these with local communities and other stakeholders and interest-groups notably the environmental and finance communities;

(xii) inform customers about the environmental performance of products and of the processes by which they were made;

(xiii) work to promote the transfer of technology that will advance environmental performance by all concerned;

(xiv) get closer to research institutions and NGOs who can help companies develop better policies and practices.

The discussions in the Conference elaborated on the actions needed in many of these fields and confirmed that the general principles were appropriate.

In the following sections, the many detailed proposals made by Conference participants have been grouped and rearranged under the three main headings mentioned earlier. In addition, a section has been added on what Governments and international bodies - including the Global 500 Forum - might do to facilitate corporate environmental excellence.

DEVELOPING A CORPORATE POLICY FOR ENVIRONMENTAL EXCELLENCE

One need in this area is to have clear understanding of what constitutes corporate environmental excellence. The action points for a Company include:

(a) accept that all people and organizations have a duty to care for the Earth and for other people today and in future generations, and that business ethics should be governed by wider social and environmental ethics. Also recognize that the environment, not industry, determines the limits of tolerance of ecosystems;

(b) accept that economic, social and environmental goals must all be pursued in an integrated way in a world that is becoming increasingly complex. The aim is for business to be profitable, environmentally friendly and socially respected;

(c) go beyond compliance with existing regulations and adopt the practices and technologies that achieve maximal ecoefficiency;

(d) accept that the world does not stand still and that our present understanding and technological capacity will change, and probably raise standards. The corporate vision must therefore reach beyond today. It must also allow for uncertainty and identify areas where risk analysis is necessary.

(e) recognize that the move to sustainable development may demand a paradigm shift from today's consumer society to one that puts more weight on conservation of nature and natural resources, durability of products and satisfaction of social needs;

(f) accept that efforts towards corporate environmental excellence must be top driven to ensure the commitment at all levels.

Against that background, a corporate environmental policy itself should:

(a) set out for a Company its goals of environmental excellence as an integral part of the wider corporate vision and mission;

(b) demonstrate firm commitment to these goals, perhaps by preparing Company "Agenda 21s";

(c) emphasise that ecoefficiency is being pursued because it is profitable and economic and environmental targets do not conflict and must be pursued together;

(d) accept key guiding principles such as the precautionary principle, the polluter pays principle (which is a no-subsidy, non-externalizing principle) and above all, the accountability principle : accountability to shareholders and stakeholders for what the Company does;

(e) adopt also the goals of the ICC Business Charter, the UNEP Bankers' Charter and the ASEAN business principles - or even better ones;

(f) set down practical measures for achieving environmental excellence within the Company, and also define how the Company will relate to the wider community.

(g) be transparent regarding how the Company will work to achieve its ends.

APPLYING ENVIRONMENTALLY ADVANTAGEOUS OPERATING PROCEDURES

Companies must convert their corporate policy into practical action. The actual approach would depend on the nature of the Company - and it is important that agendas for action are brought down to the level of practical detail. But the following elements are likely to be almost universal.

A. Motivating the entire enterprise

(a) secure the involvement and commitment of the Board of Directors and the CEO, supported by all senior management;

(b) involve expert advisers as an Environmental Advisory Group or even as "non-executive environmental directors";

(c) involve all levels of the Company in formulating and implementing the corporate environmental strategy. If the work force as a whole is able to make an input, it will feel a sense of ownership, will understand the plan better, and will implement it more energetically;

(d) ensure that the Company's training schemes cover the whole subject of ecoefficiency and environmental excellence.

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B. Adopting best practice

(e) Adopt and implement best practice for minimizing the waste of energy and raw materials, for maximum recycling and avoiding polluting discharges to the environment and the externalization of costs. How this can be done in a variety of enterprises has been illustrated by numerous case studies presented to the Conference;

(f) adopt detailed measures including:

(i) Life cycle assessment of products;

(ii) environmental impact assessment (even if not required by law);

(iii) completion of a check list of quantifiable targets against which progress can be monitored, giving an "Environmental Performance Index";

(iv) rigorous monitoring of discharges to, and impacts on the environment;

(v) monitoring of compliance with the provisions of the ICC Business Charter or other codes of practices, and with the relevant goals set out in the corporate environmental strategy;

(vi) promotion of research and development that allow introduction of practices that further enhance environmental excellence;

(vii) enter into dialogue with contractors and suppliers to ensure that they also adopt high environmental standards.

C. Reporting and accounting

(g) produce a corporate environmental report designed to inform and enthuse employees, inform local communities, educate the public, answer critics, and satisfy stakeholders, financial institutions and others that the Company is fully committed to environmental excellence;

(h) ensure that this report includes quantitative data on the Company's performance in achieving (or failing to achieve) its set targets.

(i) monitor the level of commitment to environmental excellence in the Company and the acceptability of its environmental reports and performance to the local community, consumers and others.

D. Independent certification and promotion

(j) Seek independent validation of corporate action and certification to ensure that products and processes indeed meet high environmental standards. Assess corporate environmental management of the Company against ISO 14000 and its various component elements, and work towards compliance;

(k) enlist the aid of expert consultants to criticize and help improve the Company's environmental reports, and consider the potential value of eco-counsellors in identifying unsuspected opportunities for improved environmental performance;

(l) recognize that the main barriers to progress are human, and therefore involve all major stakeholders in dialogues about the Company's role and performances, targeting in particular:

(i) local communities;
(ii) consumers;
(iii) environmental groups;
(iv) financial institutions.

(m) make the Company's environmental performance a positive feature in its promotion and marketing, and urge that it to be recognized as a "green investment" by financial institutions. Adopt eco-labelling voluntarily; it should be a selling point.

ADOPTING A WIDER ROLE TO PROMOTE SUSTAINABLE DEVELOPMENT

Companies should be outward-looking, recognizing that they can influence the social and political context in which they operate, influence the markets for their products, enhance their competitive edge and advance sustainable development. To this end they should:

(a) promote the contribution business, commerce and industry can make to sustainable development, especially through publicising success stories. There is an important leadership role for companies that can show that environmental excellence pays;

(b) press for better collective statements of business environmental goals, for example by securing a review and revision of the ICC Business Charter;

(c) seek symbiotic partnerships with other companies, municipalities and public utilities whose wastes could be used as raw materials, or with whom joint ventures would enhance local environmental conditions;

(d) negotiate with local and national governments the improvement of incentives and opportunities for sustainable development, including through the construction of a "level playing field";

(e) press for local and central governments and other components of society themselves to demonstrate environmental excellence - for example by keeping the environment clean;

(f) enter into dialogues with those responsible for environmental education, to promote understanding among young people of the positive role the business sector is playing in creating environmentally responsible sustainable development;

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(g) join Responsible Care Programmes for particular sectors, working with Public Advisory Committees linked to national trade associations or other collective groups;

AN AGENDA FOR ACTION OUTSIDE INDUSTRY

No agenda for action can work if it is confined to business, industry and commerce. Central and local governments have an essential role because they create conditions which favour or obstruct environmental excellence. Environmental organizations should similarly recognize that they are far more likely to achieve the clean world they seek by working constructively to inform and persuade industry than by continual criticism and the threat of litigation. This agenda for action is a broad one:

A. Government should:

(a) adopt national strategies for sustainable development; including national strategies to promote profitable, sustainable business, prepared in dialogue with all sectors of the community and back these by commitment at the highest level (Head of Government and Cabinet);

(b) note industry Agenda 21 initiatives and report these in annual reports to the UN Commission for Sustainable Development (CSD);

(c) promote round-table dialogues among industry and commerce and environmental and citizen groups, the scientific community and other major sectors so as to secure wide public support for the national strategy;

(d) adopt, on the basis of such dialogues, administrative measures and economic incentives that encourage corporate environmental excellence, while using and enforcing regulations where these are essential to deter the irresponsible (including those engaged in a black market of banned substances) and avoiding perverse taxes that inhibit environmental progress. Such instruments and measures should be used consistently and the corporate sector should be sheltered against arbitrary and short term changes in the operating environment;

(e) in partnership with international bodies including the World Business Council for Sustainable Development, facilitate the sharing of new and improved technologies with developing countries since the use of such technologies is likely to be essential for sustainable development at the global level;

(f) encourage the use of "alternative dispute resolution" or other dialogues as a cost-effective and constructive way of resolving conflicts between business and other sectors of society.

B. International business organizations, especially WBCSD and ICC should;

(g) lead in developing a more proactive collective role for world business, stressing its role in building prosperity in ways that are equitable, economic and environmentally sound;

(h) provide the business sector with informal services about progress in key areas, including technological advance, product assessment and certification, development of standards within ISO, the status of trade and environmental regulators (inter alia through so-called "quick scans") and best practice in advancing the goals of the ICC Business Charter;

(i) encourage environmental literacy in the business community, by providing a list or curriculum of key issues to business schools, together with background information and urging employees seek such education;

(j) provide a forum for discussion, at global or regional level, with experts who can help develop visions of the changing context in which business will operate-for example if the emphasis shifts from supply-to demand-side and the culture shifts from consumer to conserver;

C. Other organisations

(k) the World Trade Organization should press ahead with measures to ensure that where environmentally related actions affect trade, the impact is equitable and that the actions have genuine environmental merit. WTO should open more avenues for dialogue with all relevant stakeholder sectors;

(l) the various international financial institutions, including the World Bank and multilateral development banks, should include environmental excellence as a positive criterion for investment. For their part, Governments should work for stability in global capital markets so that long term investments can proceed with confidence;

(m) the various international agencies concerned with environment and development, including UNEP and UNDP, should continue to encourage environmental excellence in the business sector as a major contribution towards achieving sustainable development. ISO procedures and standards should be scrutinized to ensure that they genuinely advance environmental excellence;

(n) international and national NGOs should enter into a constructive dialogue with the business sector, based on the recognition of the essential role business can play in advancing sustainable development;

(o) the Global 500 Forum, as a unique and diverse group of environmental achievers, should develop its capacity to interact with the business world, in particular as a sounding board on likely trends in social demand made on business and industry.

CONCLUSION

The most interesting general conclusion that emerged from the Conference was that while there are many specific Asia-Pacific examples of moves towards corporate environmental excellence - for example in the oil palm industry - judging by the range of papers presented at the Conference, there is no clear evidence of major differences in the general approach from that in other regions. The companies which have participated expect to use high

standards and reject the idea that because this is still a developing region it is acceptable to use "polluting" technology that is relatively cheap today and clean up tomorrow. But is this a fair general picture?

The Conference did hear about the problems of importing advanced technologies, and in the final panel discussion some doubts were expressed about the level of commitment and action in general among the companies not represented at the Conference. The Asia-Pacific Agenda for Action should insist that it is good economics as well as good social and environmental practice to seek high standards of ecoefficiency, and adopt measures that raise companies up to the level of the best. And there seems to be agreement that in an imperfect world we would still need strict sanctions against those who deliberately breach environmental regulations.

The dialogue begun at this Conference has been valuable but needs to continue. It is clear that business in the Asia Pacific region is moving in the right direction, but may not be going fast enough. The second Global 500 Forum Conference on Environmental Management for Tomorrow's Cities to be held in Sydney in October 1996, should continue the focused, action-oriented dialogue began in Kuala Lumpur.

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18 April-3 May 1996

HIGH-LEVEL MEETING

Report of the High-Level Advisory Board on Sustainable Development on its fifth session

(New York, 29-31 January 1996)

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SUMMARY

The fifth session of the High-Level Advisory Board on Sustainable Development was held at United Nations Headquarters in New York from 29 to 31 January 1996. It examined three topics: the impact of the global multi-media communications revolution on sustainable development; sustainable energy and transport systems; and the role of the Board in the 1997 review of progress achieved in the implementation of the Rio Commitments.

The Board met with the Secretary-General on 29 and 31 January 1996. A summary of the discussion on 31 January is contained in chapter III of the report.

The Board had before it a number of background papers on particular issues and problems concerning each of the three topics. A number of technical specialists made statements and contributed to the discussion on the three topics.

On the issue of communications, the Board agreed that modern telecommunications and information technologies that were broadly accessible could promote sustainable development by promoting economic growth, providing access to information, promoting civil society and reducing energy-consuming travel. The relatively low cost of such technologies allows developing countries to "leapfrog" older, more expensive technologies. The new technologies, however, also pose risks of promoting consumerism, allowing multinational companies to exploit local situations through better information, overwhelming people with floods of information and reducing cultural diversity.

In order to expand and improve telecommunication services, many countries are now privatizing some services and introducing competition. In order to ensure broad access at affordable prices, countries are using a variety of approaches to the regulation and cross-subsidization of basic services.

The new communication and information technologies also make possible the rapid and inexpensive exchange of information and data through electronic networks, such as the Internet, thus promoting participation in policy-making, the exchange of information within interest communities and the monitoring of sustainable development indicators.

The Board agreed that every country should encourage modern information technologies and should educate the general public to enable households and businesses to benefit from globalization.

On the topic of energy and transportation, the Board noted that fossil fuels currently provide 85 per cent of world commercial energy and 97 per cent of fuel used in transportation. Most of that consumption takes place in developed countries, although most future growth is projected to occur in developing countries, where 2.5 billion people still have little access to

commercial energy. Lack of energy is a barrier to socio-economic development, but production and consumption patterns also contribute to many environmental problems.

The Board agreed that moving towards more sustainable energy and transportation economies will require making major changes in such policies as subsidies for energy and transportation, as well as reorienting energy research programmes. Such changes will yield results only over several decades because of the sheer size of the energy and transportation sectors.

Concerns about the long-term availability of fossil fuels have in recent years given way to concerns about the contribution of carbon dioxide emissions to global warming. The Board agreed that while the world would depend on fossil fuels for many decades to come, there was a great potential for increasing energy efficiency and thus alleviating the environmental impacts of fossil fuels. The potential of non-carbon fuels is also rapidly increasing. The Board agreed that the main obstacle to the wide utilization of energy-efficiency measures and renewable sources of energy is the competitive advantage of fossil fuels, which is likely to prevail as long as their environmental costs are not internalized. The Board intended to address energy issues in greater depth in its future work.

Transportation accounts for 24 per cent of world commercial energy demand, and energy demand for transportation is expected to continue to grow, particularly due to rapid growth in transportation in developing countries. The transportation sector has important impacts on sustainable development through greenhouse gas emissions and the human health effects of pollutants, urban congestion and other factors. Some estimates suggest that the social and environmental costs of current transportation patterns is equal to or greater than fuel costs. While there have been significant improvements in the fuel efficiency of vehicles in recent years, they have been offset by increases in vehicle use and use of less fuel-efficient types of vehicles. The Board urged Governments to report on their progress in responding to the recommendations of the Commission for Sustainable Development to eliminate lead from petrol.

The Board agreed that problems associated with transportation could be alleviated with new technologies for energy-efficient vehicles. Other changes, requiring more time, will include alternative fuels and notably electric-drive vehicles. Changes in the structure of transportation systems to encourage shifting to more efficient modes will make a major contribution to reducing environmental problems, but will require a more complex set of policy interventions.

Policies for sustainable energy and transportation can focus on three main objectives: (a) reducing emissions from transportation systems; (b) shifting to transportation systems with lower emissions; and (c) reducing the demand for transportation. Greater attention particularly needs to be paid to measures to discourage private transportation and encourage the use of public transportation systems.

While full internalization of the environmental costs and benefits associated with transportation is unlikely to be practicable, economic and regulatory measures in that direction should be adopted, in particular the provision of alternative transportation systems, increases in fuel prices and educational campaigns for promoting more modest lifestyles.

Since international competition can be an obstacle to the adoption of environmental policies, more effective and stringent regulation and environmental standards for transportation systems need to be implemented or coordinated at the international level.

The Board agreed that further attention should be paid to a number of questions: limiting the growth of air traffic; incentives for more efficient and cleaner cars; encouragement of least cost planning/demand-side management schemes to stimulate energy efficiency; and internationally agreed environmental taxation schemes.

Concerning the 1997 review of progress achieved in the implementation of the Rio Commitments, the Board decided that it would contribute both by (a) taking initiatives to generate debate on the implementation of the Rio Commitments in the constituencies of Board members and (b) preparing a report for submission to the Commission for Sustainable Development at its fifth session in April 1997. The Board agreed that its report would review the state of the sustainable development debate, consider the impediments to achieving sustainable development and identify actions that need to be taken towards workable targets, focusing on a limited number of critical issues, including energy and transportation as well as more general issues, such as globalization and privatization, increased access to resources and increased participation.

I. THE COMMUNICATIONS REVOLUTION AND SUSTAINABLE DEVELOPMENT

A. Telecommunications and sustainable development

1. Modern telecommunications and information technologies that are broadly accessible can promote sustainable development in a number of ways: by promoting economic growth and diversification; by providing people with information on sustainability; by promoting and facilitating a vigorous civil society; and by reducing energy-consuming transportation, by such means as electronic conferences, video conferences, telecommuting, remote education and telemedicine. The low cost of such technologies relative to older communication systems allows developing countries to "leapfrog" over older technologies: some developing countries already have a higher proportion of digital lines than many developed countries. Modern telecommunications can also help reduce the brain drain by allowing people in developing countries to keep in touch with colleagues and developments worldwide. To realize such benefits, societies should recognize communications as a basic need, and should facilitate universal access.

2. However, the new technologies also pose risks for sustainable development: they may promote the globalization of consumerism through advertising or other means; they threaten to overwhelm people with an unmanageable flood of information of variable quality and reliability, requiring the development of new skills for assessing and managing information; and they may allow large multinational companies to exploit local situations based on their access to better information. There is also a need to ensure that cultural diversity is preserved.

3. While most of the new technologies are developing in response to demand from developed countries, some are of particular interest to developing countries. For example, new radio-telephone technologies allow the extension of basic services to rural and remote areas at a much lower cost than traditional land lines. Telecommunications is also opening new economic opportunities for developing countries by enabling them to provide labour-intensive information services to markets in developed countries. India, for example, has a rapidly growing computer software industry, with clients in developed countries, and in Jamaica more than 25 firms provide information-processing services to clients in the United States of America and Canada.

B. Improving telecommunication services

4. To expand and improve telecommunication services, many countries are now adopting a pluralistic approach to the telecommunication sector that allows the operation of either private enterprises in open competition, regulated private monopolies or other government-owned agencies, with regulations to ensure that all users have access to services at reasonable prices and that all enterprises have fair opportunities in the competitive sectors. There is no single model for such a restructuring process; each process depends on the existing telecommunications organization and infrastructure, the size of the country and

market, its technological level and its economic structure. However, individual countries must bear in mind the global nature of the new information technology.

5. Promoting universal access to basic telecommunication services may require the cross-subsidization of some services. In general, however, telecommunications need not be subsidized from general government revenues because there is normally sufficient capacity to pay. Other telecommunication services, such as information services, electronic mail, remote education, telemedicine or the Internet, should be available on the basis of full cost recovery.

C. Electronic networks

6. Developments in telecommunications, computers, satellites and fibre optic technologies, including both new capabilities and reduced costs, have also opened new possibilities for rapid and inexpensive national and international exchange of information and data through electronic networks, such as the Internet. Such capabilities can serve to promote broad participation in policy-making processes; the exchange of information within non-localized interest communities, such as environmental or women's groups; access to and monitoring of social development indicators; communication between businesses and clients both nationally and internationally; the decentralization of governmental and commercial services; the exchange of data among financial institutions; and a variety of other purposes that contribute to sustainable development. There is a great demand for access to such networks by private organizations, government offices, and research and teaching institutions.

7. For many countries, information and data on national conditions and activities, including sustainable development, are more readily available through international organizations than through national sources. All countries provide information to the United Nations, the World Bank and the specialized agencies, and much of that information is available in various forms, directly or indirectly, through the Internet. The establishment of national networks connected to the Internet will not only provide immediate access to such information but will also encourage national information sources to make data and information directly available on the national network.

8. While most countries in the world have one or more sites connected to the Internet via international leased lines or small satellite terminals, many still do not, particularly in Africa. Among the 48 least developed countries, only two have networks or host computers directly connected to the Internet. The barriers to connection are primarily due not to the complexity or cost of the technology but to institutional and regulatory obstacles.

9. Constraints to the establishment of such networks in some countries include regulatory provisions that prohibit network operators from leasing lines and charging for networking services or limit the use of modems on telephone lines. In other countries, telecommunications agencies have seen electronic networks as a way of improving services and have supported their development.

The United Nations Development Programme (UNDP) Sustainable Development Networking Programme (SDNP) is providing support to developing countries for the start-up phase of electronic networks connecting universities, government agencies, UNDP offices and other offices concerned with sustainable development. The host organization, which is selected by a national steering committee, may be a university, government agency, or non-governmental organization, and is expected to provide all interested users with access to the network and to the Internet, via computer, modem and telephone line. The networks are generally expected to become self-financing through user subscriptions within two years, although the time necessary will depend on the size of the country, the availability of computers and telephone lines, and the initiative of the network organizers. The cost of setting up such a service and operating it for two years has been about $150,000. Since 1992, SDNP has facilitated the introduction of data-transfer nodes in 21 countries, and another 10 are expected to become operational in 1996.

D. Conclusions

10. A communications revolution is under way and the information society is rapidly replacing the industrial society. Every country should encourage modern information technologies, including the Internet and local networks, in order to enable its households and businesses to derive greater benefits from the process of globalization. Countries should prepare for the new era by educating the general public, in particular the illiterate. The young people of each nation will have to be leaders of change, and the older generation will have to ensure the continuity of their culture. The communications revolution represents an enormous challenge, because it will change family life and people's relationships with their spiritual traditions, social customs and social hierarchies.

11. All levels of society should contribute to meeting the challenges of the information society, as follows:

(a) Parents must maintain the cohesion of the family unit;

(b) Grass-roots organizations, communities and interest groups must promote broad public participation in sustainable development;

(c) Local governments must provide a forum for sharing ideas and problems, and for involving the community in its work through such media as electronic bulletin boards;

(d) State or regional governments must provide data banks and expert advice;

(e) Federal governments must prepare an appropriate legal and regulatory framework, must supply funds and must facilitate interaction with large industries in developing a communications infrastructure;

(f) The international community must do more to ensure that all countries benefit from the communications revolution.

II. SUSTAINABLE ENERGY AND TRANSPORTATION SYSTEMS

A. Aspects of the energy problem

12. In the world economy, the consumption of energy and transportation services and investment in those sectors accounts for 10-15 per cent of world gross domestic product (GDP). About 20 per cent of world investment goes into the energy sector, and about 10 per cent goes into transportation infrastructure. The world fossil fuel industry is a $1 trillion-per-year business in a world economy of about $26 trillion. The World Energy Council estimates that annual investments in the entire world energy sector of $1 trillion per year are needed to match expected increases in demand.

13. Worldwide, fossil fuels contribute about 85 per cent of world commercial primary energy supplies, 97 per cent of fuel used in transportation, and 64 per cent of electricity connected to grids.

14. Although most of the consumption of global energy currently takes place in the developed countries, most future growth is projected to occur in the developing countries. In 1990 developing countries accounted for 29 per cent of global energy: that share is projected to increase to almost 50 per cent by the year 2020, while the share of industrialized countries is expected to drop from 51 per cent to just below 40 per cent, and that of economies in transition to drop from about 20 per cent to about 15 per cent.

15. In developing countries, 2.5 billion people, mostly in rural areas, have little access to commercial energy supplies. If lack of energy is a barrier to socio-economic development and growth, the ways in which it is produced and used, together with its current and projected scale, contribute to many environmental problems.

16. Moving towards a more sustainable world energy and transportation economy will require major changes in policies that will in turn yield results only over several decades because of the sheer size of the sector. Yet there are currently many examples of deficient policies. For example, government subsidies for energy prices worldwide are approximately $200 billion per year, and in developing countries total energy subsidies in 1992 was larger than all official development assistance. Another problem is that Governments in developed countries spend over 50 per cent of their $8 billion-a-year energy research budgets on nuclear programmes, whereas renewable energy sources get less than 10 per cent. Businesses that subsidize the use of cars by their employees often get a tax break.

17. Globally, the world energy sector has been the subject of much intensive study over the years, and concerns about the long-term availability and security of fossil fuels have largely given way to concerns about the contribution of anthropogenic emissions of carbon dioxide to global warming, especially in the

work of the Intergovernmental Panel on Climate Change. Concerns have also been raised about the safety of nuclear energy.

18. The world will depend on fossil fuels for many decades to come for both electricity generation and transportation. However, there is a very great potential for increasing energy efficiency, which can theoretically alleviate the environmental impacts of fossil fuels to a large extent. In addition, the potential of non-carbon fuels is rapidly increasing. The main obstacle to the wide utilization of both energy efficiency measures and renewable sources of energy, including solar, wind and tidal energy technologies, is the competitive advantage of fossil fuels, which is likely to prevail as long as their environmental costs are not internalized.

19. The Board intends to address energy issues in greater depth in its future work, but at the present meeting decided to focus on issues in the transportation sector.

B. Transportation issues

20. In 1990, transportation accounted for 24 per cent of world final (commercial) energy demand and about 30 per cent in countries that are members of the Organisation for Economic Cooperation and Development (OECD). Comparable figures for OECD countries in North America and for the developing countries were 34 and 17 per cent, respectively, reflecting the huge gap in motorization between developed and developing countries.

21. In 1990, transportation demand was responsible for two thirds of the additional growth in energy demand in the developed countries, compared with about 15 per cent of the additional growth in developing countries and economies in transition.

22. Globally, about 60 per cent of energy consumption for transportation is accounted for by passenger travel and 40 per cent by the transportation of goods. The transportation of goods and gross national product (GNP) are strongly and positively correlated. The choice of transportation mode over time has favoured faster and more energy-intensive transportation modes. Passenger transportation is much less highly correlated with GNP or GNP per capita: transportation policies, infrastructure availability, urban spatial configurations and sociocultural factors and preferences make a large difference in choice among passenger transportation modes.

23. A number of scenarios of future world transportation demand prepared by IIASA suggest that based on current policies, recent observed trend increases in mobility and changes in transportation modes will dominate the evolution of fuel efficiency, which implies the growth of global transportation energy demand at more or less similar (linear) rates as in previous decades. The scenarios indicate a tendency towards saturation of transportation demand in OECD countries but continued rapid growth in developing countries due to the efforts by many fast-growing developing countries to catch up with the developed countries.

24. The transportation sector is of considerable interest not only because of its importance as a source of greenhouse gas emissions but also because of the effects on human health and the environment associated with other pollutants and a number of other issues, such as traffic accidents, congestion, noise, impeded access to cities, competition for land use and restricted access of the poor to basic services - problems that are of increasing importance in developing countries.

25. Some estimates suggest that the social and environmental costs associated with current transportation patterns at least equal pre-tax marginal fuel costs, and may be as much as four times that amount.

26. While there have been large improvements in fuel efficiency and in controlling emissions per unit of fuel consumed, those effects have been offset in automobile transportation by increased numbers of vehicles per person (motorization); increased numbers of trips per vehicle (mobility); and shifts towards less fuel-efficient types of vehicles, such as minivans, four-wheel drive vehicles and light trucks. In air transportation, there have been large improvements in energy efficiency due to more seating capacity per plane, higher utilization rates and engine improvements, but here again increases in the volume of air travel have meant steadily rising levels of harmful emissions. In addition, the impact of emissions in the stratosphere is more severe than low-level atmospheric emissions.

C. New technologies

27. There are a number of ways in which some problems associated with transportation can yield to improved technology even in the short and medium terms: these are mainly improvements in internal combustion engine design and reformulated fossil fuels resulting in cleaner and more energy-efficient vehicles. Other changes, requiring more time, would include alternative fuels and electric-drive vehicles; the scope for such improvements is especially great for automobiles and buses but less so for air transportation. Changes in the structure of transportation systems to encourage modal shifting towards inherently more eco-efficient modes, such as rail and inland water for freight and increased urban mass-transit and high speed inter-city rail for passenger travel, would make a major contribution to reducing environmental problems but require a more complex set of policy interventions. Beyond the problems of emissions, congestion is also a problem, for the relief of which a combination of mass transit and management of access to congested areas has considerable possibilities.

D. Policies to support and force the pace of change

28. Policies can be focused on three main strategic objectives: (a) the reduction of emissions from each transportation mode; (b) encouraging shifts among transportation modes; and (c) managing transportation demand. Economic investments, regulatory approaches and urban and spatial planning all have important roles to play.

29. Although measures to accelerate the introduction of technologies for reducing harmful emissions and improving fuel efficiency have great potential to reduce environmental impacts, growth in the volume of traffic generally outweighs such gains. Measures to reduce the demand for transportation thus deserve greater attention. Integrated land-use and transportation planning to favour mass transit is one such approach, which might include such measures as (a) concentrating high-density residential development areas and destinations that attract visitors in areas that are well served by public transportation, and perhaps banning supermarkets that are not accessible by public transportation; (b) using revenues from tolls, parking charges, vehicle registration fees and taxes to finance public transportation; (c) restricting access to town centres by means of parking charges, tolls or outright bans; (d) extension of public transportation network coverage, capacity and frequency; (e) enhancement of speed and accessibility, such as by designated lanes for public transportation and car pooling; (f) improved comfort and security; and (g) expanded parking at main transit terminals and park-and-ride facilities in suburban areas. In addition, a number of trends related to the telecommunication and information revolution, such as "teleworking" and "teleshopping", might be encouraged or reinforced by public policy to reduce the demand for low-occupancy commuter travel.

30. Demand management has been utilized in a few cities, together with the provision of mass transit alternatives to reduce congestion in urban areas. Singapore has perhaps the most comprehensive system, involving a number of measures, including automated road charging and steep vehicle ownership and parking charges, that were introduced with advance preparations, including the provision of by-pass routes, park-and-ride facilities and expanded bus service. Despite its high level of per capita income and rapid GDP growth, such measures have reduced the rate of growth of automobiles to about 3 per cent per year. Hong Kong, Oslo and a number of Scandinavian cities are experimenting with similar measures.

E. Preliminary conclusions and policy recommendations

31. The transportation sector is crucially important to national, regional and international strategies for sustainable development. Ample evidence exists that certain types of policy approaches have proven effective in stimulating more energy-efficient and less polluting vehicles, and that more needs to be done to manage demand in ways that address the need for mobility, especially by providing greater consumer choice among transportation modes. Governments are urged to report on their progress in responding to the recommendations made by the Commission at its second session to eliminate lead from petrol.

32. While remaining an important goal, the strict internalization of all the external costs and benefits associated with transportation is unlikely to be practicable; however, policy should move in that direction by adopting appropriate economic and regulatory instruments. Combined with the provision of alternative transportation options, steadily rising fuel prices - perhaps limited to the rate of improvement in the average efficiency of the car fleet - could influence lifestyles, the design of vehicles, the choice of locations for residences and businesses, driver behaviour, the choice of transportation mode

and trip length. Such measures may need to be supplemented by educational campaigns for promoting more modest lifestyles, such as driving smaller cars.

33. Greater international cooperation is also needed. In view of the strong international competition in automobile markets and the relationship of national manufacturers to their Governments, effective action needs to be taken at the international level to develop more effective and stringent regulatory frameworks, such as internationally agreed standards for air quality, motor vehicle emissions and fuel economy at least among OECD countries. Similarly, fiscal and pricing mechanisms for restraining transportation demand, especially fuel or energy taxes, need to be implemented or coordinated at the international level.

34. The following questions may deserve further intensive consideration by the relevant bodies:

(a) Abating the growth rate of air traffic in view of its increasing contributions to global environmental problems;

(b) Devising schemes and incentive systems for introducing more efficient and cleaner cars;

(c) Encouraging all countries to develop least-cost planning/demand-side management schemes, as have been successfully introduced in many localities to stimulate energy efficiency;

(d) Initiating internationally agreed environmental taxation schemes;

(e) Assigning transportation and energy issues that have hitherto been addressed primarily at the national and regional levels by intergovernmental bodies for the consideration of an appropriate intergovernmental body at the international level.

III. MEETING WITH THE SECRETARY-GENERAL

35. The Board met with the Secretary-General during its morning meeting on Wednesday, 31 January. The meeting began with a review by the Chairman, Ms. Birgitta Dahl (Sweden), of discussions over the previous two days. At the request of the Secretary-General, the members of the Board presented their views on critical issues relating to sustainable development, and the Secretary-General responded to those statements.

36. Concerning the communications revolution, there was agreement among Board members that all countries and groups needed to have access to modern information technologies in order to promote sustainable development and broad participation in such development. There were also concerns, however, that the new technologies would lead to growing social and economic gaps and injustice, and would threaten cultural diversity, religious values and even individual freedom; there was therefore a need to study ways to make the new technologies widely accessible and supportive of sustainable development.

37. On the question of sustainable energy and transportation, there was wide agreement that sustainability required fundamental changes in lifestyles and attitudes. Finding ways to promote those changes would require the formulation of alternative scenarios of environmental change and strategies for sustainable development. It was agreed that questions relating to sustainable energy and transportation were not being adequately addressed at the international level. The Board would continue to address questions of sustainable energy and transportation at its future sessions and in its contribution to the 1997 review of progress on the Rio Commitments.

38. More generally, members of the Board emphasized the need to identify impediments to sustainable development and implementation of the Rio Commitments, 1/ and to propose ways to overcome those impediments. There was general agreement that the international political and economic environments were in many ways becoming less conducive to sustainable development. The developed countries were focusing on creating jobs; research funding was increasingly limited to short-term problems; and development assistance was succumbing to "fatigue", fiscal imbalances, pressures of global competition, reduced political priority following the end of the cold war and an increasingly inward orientation on the part of developed countries. For such reasons, members concluded, no progress was being made towards limiting the consumption of natural resources.

39. One sustainable development strategy proposed was to increase the efficiency of resource use. It should be possible to quadruple the goods and services that could be produced with a given quantity of natural resources and energy, which would enable developing countries to quadruple their production and consumption without increasing their environmental impact, while the developed countries could maintain their standard of living while greatly reducing their environmental impact.

40. Another view was that new technologies and improvements in resource efficiency were not going to solve the problem of sustainable development because without fundamental changes in consumption patterns, efficiency was unlikely to increase faster than the volume of consumption. From that point of view, sustainable development was primarily a responsibility of the developed countries, which should avoid exporting their consumerism to developing countries. Societies would have to choose whether they wanted to be high-consumption "engineered worlds", of which Singapore was taken as an example, or more natural and bio-diverse worlds with lower levels of consumption.

41. It was noted that some countries in Asia were enjoying rapid development and were making efforts to improve their environments by such measures as reducing river pollution and reforesting degraded areas, a success in development that was seen to be partly a result of cultural and religious values. A merging of Eastern and Western cultures was proposed to balance material and religious values. It was also noted that some Asian countries had active environmental movements, and that some unsustainable projects, including the construction of dams and projects involving deforestation, had been stopped by popular opposition.

42. It was noted that most countries in Africa were not enjoying any development: their priority was the alleviation of poverty. One member noted that attempts to impose on African countries the norms of democracy that prevailed in developed countries did not offer a solution to poverty.

43. There was widespread agreement that any sustainable development strategy should include the internalization of environmental costs into the prices of goods and services. One member noted that in the current political and economic environment, opposition to subsidies for resource consumption was generally a more effective strategy than direct appeals for environmental protection.

44. A number of Board members, in addressing the question of how to promote sustainable development, called for publicizing success stories and "win-win" situations. It was suggested that sustainable development needed to be presented so as to make it attractive to everyone, which might require it being presented in different ways to different groups. It was suggested that sustainable development should be promoted to a broad public, particularly at the grass-roots level. Such promotion could use a variety of media, including comics and compact disks.

45. The Secretary-General, in his response to the views of the members of the Board, noted that sustainable development was a long-term goal and that the Board could play an important role in emphasizing the need for a long-term perspective. He noted the decline in development assistance and the reorientation of the donor countries towards improving governance and administration in response to the failure of many previous economic assistance programmes. He also noted that political stability was a precondition for effective sustainable development programmes at the national level, and that humanitarian relief efforts in war-torn countries were diverting resources from development assistance.

IV. ARRANGEMENTS FOR FUTURE WORK: CONTRIBUTION TO THE 1997 REVIEW OF PROGRESS IN THE IMPLEMENTATION OF THE RIO COMMITMENTS

46. The Board agreed to make a contribution to the 1997 review of progress achieved in the implementation of the Rio Commitments, 1/ including the following:

(a) Members will envisage initiatives to generate debate on the 1997 review in their own constituencies (consideration should be given to the question of specifying such commitments);

(b) The Board is by definition an independent body, and thus sees some advantage in formulating a report with independent recommendations that could be made available as an input to the fifth session of the Commission, in 1997.

47. The Board was informed of the documentation to be prepared by the Secretary-General for the special session of the General Assembly in June 1997 and the fourth session of the Commission. It agreed that its report to the Commission should be very specific and should not exceed 20 pages.

48. The Board drafted an outline for the report which is contained in annex I, and decided on the following process for its preparation. The members will provide their inputs for the various sectors to the secretariat of the Board, which will prepare a first draft for the sixth session of the Board (4-6 September 1996), at which the Board will conduct an in-depth discussion on issues to be identified. A final draft will be prepared for the seventh session of the Board (January 1997); it may require editing by a professional journalist.

V. ORGANIZATION OF THE SESSION

49. The fifth session of the High-Level Advisory Board on Sustainable Development was held at United Nations Headquarters from 29 to 31 January 1996. Sixteen members of the Board attended: Maria Julia Alsogaray, Christine Amaoko-Nuama, Princess Basma Bint Talal, Birgitta Dahl, Nikolai Drozdov, Abid Hussein, Jörg Imberger, Jacques Lesourne, Marcilio Marques Moreira, Laura Novoa, Qu Geping, Emil Salim, Maurice Strong, Suh Sang-Mok, Mostafa Tolba and Ernst-Ulrich von Weizsäcker. Two members were unable to attend: David Hamburg and David Pearce.

50. The Board unanimously elected the following officers to serve for the 1996-1997 term: Birgitta Dahl (Chairperson), Emil Salim (Vice-Chairperson) and Jörg Imberger (Rapporteur).

51. The session was opened by the Under-Secretary-General for Policy Coordination and Sustainable Development of the United Nations Secretariat. The Chairperson made an opening statement, noting the special role that the Board could play by providing an independent input to the intergovernmental review of the implementation of the UNCED Commitments. Mr. Maurice Strong reviewed the current status of the implementation of the UNCED Commitments and the possible role of the Board in revitalizing the implementation process in the new political and economic context.

52. The opening meeting was also addressed by the Secretary-General, who noted that the Board had been established to provide him with advice on the implementation of Agenda 21 and other efforts in support of sustainable development. He said that the Board could provide ideas and dynamism to the intergovernmental process, and could help to promote understanding of and support for the role of the United Nations in promoting sustainable development, in contrast to the popular misconception that the Organization was primarily focused on peace-keeping activities.

53. The Director of the Division for Sustainable Development of the Department for Policy Coordination and Sustainable Development reviewed preparations for the 1997 special session of the General Assembly to review progress achieved in the implementation of the UNCED Commitments. Ms. Laura Novoa, who was also a member of the Board during the 1994-1995 term, reviewed for the benefit of the new members the work done at the first four sessions of the Board.

54. In its substantive deliberations, the Board examined three topics: the impact of the global multimedia communications revolution on sustainable

development; sustainable energy and transportation systems; and the role of the Board in the 1997 review of progress achieved in implementation of the UNCED Commitments (see agenda in annex II). The Board had before it a number of background papers on particular issues and problems concerning each of the three topics. Technical specialists on electronic networking and sustainable transportation made statements and contributed to the discussion of each topic.

55. The Secretary-General met with the Board again on 31 January (for summary of that meeting, see chap. III above).

56. Substantive services for the session were provided by the Department for Policy Coordination and Sustainable Development.

Notes

1/ The Rio Declaration on Environment and Development, Agenda 21, and the Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests, which are known collectively as the Rio Commitments; see Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigenda), resolution 1, annexes I, II and III.

Annex I

OUTLINE OF A REPORT FOR SUBMISSION TO THE COMMISSION ON SUSTAINABLE DEVELOPMENT AT ITS FIFTH SESSION AS A CONTRIBUTION TO THE 1997 REVIEW OF PROGRESS IN THE IMPLEMENTATION OF THE RIO COMMITMENTS

I. THE SUSTAINABLE DEVELOPMENT DEBATE FOUR YEARS AFTER THE UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT

Crisis of vision and commitment

Less than four years after the Conference, the very vision of sustainable development is under duress and suffering from inbuilt tension. The following questions need to be addressed:

(a) Is sustainable development attainable?

(b) Is it a non sequitur?

(c) Does it matter?

It does matter

Sustainable development is not a dogmatic concept but an asymptotic process in which tension is inherent (for example, intergenerational aspects versus short-term needs).

It is a means for raising the quality of life of human beings, rich or poor.

The eradication of poverty is at the heart of sustainable development.

A sustainable society

Perspectives of what constitutes a sustainable society will vary with different values and political priorities.

The role of the Principles contained in the Rio Declaration on Environment and Development needs to be defined.

II. IMPEDIMENTS TO ACHIEVING SUSTAINABLE DEVELOPMENT

Loss of political momentum

The loss of political momentum is a consequence of a short attention span, combat fatigue and a deep fiscal crisis of the public sector in practically all OECD countries, a crisis that is epitomized by the current situation of the United Nations, which is plagued by financial collapse, a distorted image and low morale.

Lack of financial resources

Official development assistance and specific environmental funding are both inadequate.

Why do the old formulas not work?

Lack of access to technology

Applied technology is private property.

Failure of the market to internalize costs

Sectoral approaches to development

Case-studies: why are the targets in Agenda 21 not being achieved?

Agenda 21 includes a limited number of quantified targets, as described below.

Chapter 6 on health: targets for the eradication/reduction of certain diseases by 2000 (para. 6.12); targets for minimizing health hazards (para. 6.40).

Chapter 7 on human settlements: provision of adequate environmental infrastructure in all settlements by 2025 (para. 7.38); achieve substantial improvements in the efficiency of government activities by 2000 (para. 7.77).

Chapter 10 on integrated land management: improve and strengthen planning, management and evaluation systems by not later than 2000; strengthen institutions and coordinating mechanisms by not later than 1998; and create mechanisms for participation of all concerned by not later than 1996 (para. 10.5).

Chapter 11 on combating deforestation: strengthen the capacities and capabilities of national institutions by 2000 (para. 11.2).

Chapter 13 on mountain ecosystems: develop appropriate land-use planning and management in mountain-fed watershed areas by 2000 (para. 13.15).

Chapter 14 on agriculture: maintain and develop multisectoral plans to enhance sustainable food production not later than 1998; maintain and enhance the ability of developing countries, particularly the least developed countries, to themselves manage policy, programming and planning activities, not later than 2005 (para. 14.8).

(To be completed with other targets)

III. THE WAY FORWARD

(To be discussed in general terms and applied to a limited number of critical issues)

A. General issues

How can we benefit from globalization and privatization? Relevant issues are:

(a) Public control of public goods;

(b) Getting the prices right/internalizing environmental externalities, by:

(i) Appropriate valuation of resources;

(ii) Different trade-offs for national and international (global) problems;

(iii) Recognizing need for a global regime for internalization;

(iv) Establishing principles for convergence of trade and sustainable development.

Increase access to resource flows, technology, finances, and intellectual property, by exploring:

(a) New approaches to mobilization of financial resources;

(b) New approaches to mobilization of technology transfer;

(c) Ways to change attitudes and mindsets (new paradigm in economic theory).

An efficiency revolution is needed to cope with the environmental consequences of predicted growth rates. This will make domestic economies stronger, not weaker. How can information technologies contribute to enhanced efficiency?

Democracy and new forms of governance, involving major groups are needed.

The mobilization of women is a positive force for change.

Participatory structures must be developed at all levels of civil society, including grass-roots organizations and other major groups.

Vulnerable groups should receive priority attention.

Sustainable development curricula should be developed in education programmes from kindergarten to university.

Strategic alliances need to be formed both within countries and externally.

Intersectoral decision-making in the United Nations needs to be fostered. What is the role of the Commission for Sustainable Development?

B. The case of energy

Achievable targets must be established.

C. The case of transportation

Achievable targets must be established (see discussion in sect. II of the present report)

Annex II

AGENDA

1. Opening of the session.
2. Election of officers.
3. Adoption of the agenda and schedule of work.
4. Report of the Board on its fourth session.
5. Impact of the global multimedia communications revolution on sustainable development.
6. Sustainable energy and transport systems.
7. Role of the Board in the 1997 review of progress in the implementation of the Rio Commitments.
8. Other matters.
9. Future work of the Board.
10. Adoption of the report of the Board on its fifth session.

Annex III

CURRICULA VITAE OF BOARD MEMBERS

Chairperson

Birgitta DAHL (Sweden). Speaker, Parliament of Sweden. Member, Executive Committee of the Social Democratic Party. Member, Advisory Council on Foreign Affairs. Former positions include Minister of Environment (1990-1991), Minister of Environment and Energy (1986-1990), Minister of Energy (1982-1986). Received professional education in Sweden (History and Political Science).

Vice-Chairperson

Emil SALIM (Indonesia). Member of the Economic Team of the President of Indonesia; member, People's Consultative Congress; member, Academy of Sciences, Indonesia. Former positions include Minister of State for Population and the Environment; President, Governing Council of UNEP; Professor in Economics, University of Indonesia. Received professional education in Indonesia and the United States of America (Economics). J. Paul Getty award (U.S. World Wild Life Fund). Author of Pemerataan Pendapatan and Perencanaan (1978); Pembangunan Berwawasan (1986).

Rapporteur

Jörg IMBERGER (Australia). Professor of Environmental Engineering, Director of the Centre for Environmental Fluid Dynamics and Chair of the Centre for Water Research, University of Western Australia. Currently Chair of the Western Australia Esturaine Research Foundation and Scientific Adviser to Earthwatch. Member, Australian Academy of Sciences. Past posts include various academic positions in Australia and abroad, and consultancies to many state and federal government bodies and private agencies. Recipient of various awards for contribution to environmental issues. Received professional education in Australia and the United States of America.

Members

Maria Julia ALSOGARAY (Argentina). Member of the National Cabinet; Secretary of the Secretariat for Natural Resources and Human Environment. Former positions include Vice-President, National Defense Commission of the National Chamber of Deputies; Member, Commission of Foreign Relations, National Defense, Science and Technology; National Congresswomen for the Unión del Centro Democrático, Buenos Aires; Delegate of Argentina to the Argentine-Uruguayan Economic Cooperation Agreement; Adviser in the delegation to the Latin American Free Trade Associations; and various positions in the private sector. Received professional education in Argentina.

Christina AMAOKO-NUAMA (Ghana). Minister for Environment, Science and Technology. Former positions include Minister for Environment; environmental consultant active in biodiversity conservation; member of Ghana National

Development Planning Commission. Held various academic positions. Received professional education in Ghana and Canada.

Her Highness Princess Basma BINT TALAL (Jordan). Founder of Queen Alia Fund for Social Development and Chairperson of its Board of Trustees; Chairperson of Arab Association of Women and Development; Chairperson, Jordanian National Committee for Women.

Nikolai DROZDOV (Russia). Environmental writer and Biologist. Associate Professor, Faculty of Geography, Moscow State University; presenter and producer of well-known Russian TV programme "In the world of animals" and other nature programmes. Took part in the UNESCO Man and Biosphere expedition to the Pacific islands of Tonga and Samoa. Author of 20 books and numerous research papers on biology, geography and nature conservation. Recipient of several international awards. Received professional education in the Russian Federation and Australia. Member of Explorers Club and New York Academy of Sciences.

David A. HAMBURG (United States of America). President, Carnegie Corporation of New York. Serves on the boards of the Rockefeller University, the Mount Sinai Medical Center, the American Museum of Natural History, the Johann Jacobs Foundation. Member, American Philosophical Society and American Academy of Arts and Sciences. Former positions include Professor and Chairman, Department of Psychiatry and Behavioral Sciences, and Reed-Hodgson Professor of Human Biology, Stanford University; President of the Institute of Medicine, National Academy of Sciences; Director, Division of Health Policy Research and Education, and John D. MacArthur Professor of Health Policy, Harvard University; Chairman of the Board, American Association for Advancement of Science. Served as Chairman and member of several national science policy groups, including the President's Committee of Advisors on Science and Technology. Research interests and contributions include biological responses and adaptive behaviour, human aggression, biomedical and behavioural sciences, links between behaviour and health, and child and adolescent development. Received professional education in the United States. Author of Today's Children: Creating a Future for a Generation in Crisis.

Abid HUSSEIN (India). Formerly Ambassador to the United States. Currently Vice-Chairman, Rajiv Gandhi Institute for Contemporary Studies, Rajiv Gandhi Foundation.

Jacques LESOURNE (France). Professor, Conservatoire des Arts et Metiers. Former positions include Director, Le Monde; Founder, Society for Economics and Applied Mathematics; Leader, OECD Interfutures Project.

Marcilio Marques MOREIRA (Brazil). Director, Programme of Advanced International Studies, State University, Rio de Janeiro; Special Adviser to the Mayor of Rio de Janeiro and Senior International Advisor to Merrill Lynch; Member of the Advisory Boards of General Electric, South America, Hoechst-Brazil and American Bank Note-Brasil. Previous positions include Minister of Economy, Finance and Planning; Ambassador to the United States; Alternate Director, International Monetary Fund and InterAmerican Development Bank; Adviser to the Minister of Finance and member of the Board of the National Development Bank; several other high-level positions in academia, administration and private

sector. Member of the boards of various other institutions and professional organizations. Author and co-author of several books. Received professional education in Brazil and the United States of America.

Laura NOVOA (Chile). President, PARTICIPA (a Chilean non-governmental organization on education and democracy); member of the Council, PAZ CIUDADANA, member of the law firm Philippi, Yrarrazaval, Pulido and Langlois (mining and corporate matters); formerly responsible for public services in State mining companies; collaborated in the drafting of various bills; member of Commission on Truth and Reconciliation. Recipient of Keogh Award from New York University for distinguished public services. Received professional education in Chile and the United States of America (Law).

David PEARCE (United Kingdom of Great Britain and Northern Ireland). Professor of Environmental Economics, University College, London, and Director, Centre for Social and Economic Research on the Global Environment; Chairman, ECE Economic Group on Acid Rain; member, Scientific Advisory Panel of the Global Environment Facility. Previous positions include Personal Adviser to the Secretary of State for Environment, United Kingdom. Author, co-author or editor of many books on economics, environment, sustainable development; extensive international consultative experience. Received professional education in the United Kingdom.

QU Geping (China). Chairman, Environmental and Resource Protection Committee, National Peoples' Congress. Former positions include Vice-Chairman, Environmental Protection Commission, State Council Administrator, Environmental Protection Agency, China. Head of Mission of China to UNEP. Received professional education (Engineering) in China and the United Kingdom. Author of numerous publications on environmental issues, including China's Environment and Development (1993); Studies on Environmental Services in China.

Maurice STRONG (Canada). Chairman and Chief Executive Officer, Ontario Hydro. Former positions include Secretary-General, United Nations Conference on Environment and Development; Under-Secretary-General and Executive Coordinator, the United Nations Office for Emergency Operations in Africa; Director, United Nations Environment Programme; President and Chief Executive Officer, Petro-Canada; Chairman, Board of Governors, International Development Research Centre, Canada. Received professional education in Canada (Business). Recipient of numerous awards and honorary doctorates.

SUH Sang-Mok (Republic of Korea). Member, National Assembly; Chairman, Kangnam-gu A District Chapter, Seoul; President, Institute for Public Policy Studies. Previous positions include Minister, Ministry of Health and Welfare; Director-General, Policy Coordination Office, the Democratic Liberal Party; member of several National Assembly committees; Vice-President, Korean Development Institute; member, Pacific Board of Economists, Time Magazine; Senior Counsellor to the Deputy Prime Minister and Minister for the Economic Planning Board of the Republic of Korea. Author of several books and articles. Received professional education in the United States.

Mostafa TOLBA (Egypt). Professor, Faculty of Science, Cairo University. President, ECOPAST - Centre for Environment and Cultural Heritage, Washington, D.C.; President, International Centre for Environment and

Development. Former positions include Under-Secretary-General and Executive Director, UNEP; Head, Egyptian delegation to the Stockholm Conference on Human Environment (1972). Received professional education in Egypt and the United Kingdom (Botany). Author of numerous papers on plant diseases, anti-fungal substances and physiology of micro-organisms and on the environment, including Sustainable Development: Constraints and Opportunities (1987).

Ernst Ulrich von WEIZSÄCKER (Germany). President, Wuppertal Institute for Climate, Environment and Energy, Science Centre, North-Rhine Westphalia. Member of the Club of Rome. Previous positions include Director, Institute for European Environment Policy; Director, United Nations Centre for Science and Technology for Development; President, University of Kassel, Germany; Chairman, Association of German scientists. Author of Ecological Tax Reform, Earth Policies; co-author of Factor Four: Doubling Wealth, Halving Resource Use (forthcoming).

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REVIEW OF SECTORAL CLUSTERS: PROGRESS REPORT OF THE AD HOC INTERGOVERNMENTAL PANEL ON FORESTS

Note by the Secretary-General

1. The Ad Hoc Intergovernmental Panel on Forests, established at the third session of the Commission on Sustainable Development, has held two of its four sessions. At its first session, which was held in New York from 11 to 15 September 1995, the Panel established its programme of work. The report on that session was issued as document E/CN.17/IPF/1995/3.

2. The second session of the Panel was held in Geneva from 11 to 22 March 1996. In accordance with the Panel's programme of work, there were substantive discussions of programme elements I.2, I.4, I.5, II, and III (a) and (b); there were initial discussions of programme elements I.1, I.3, III.2, IV and V.1 The report on the second session of the Panel is being issued as document E/CN.17/1996/24.

3. Following a decision taken by the Commission at its third session, a secretariat, headed by a coordinator, was established for the Panel in the Department for Policy Coordination and Sustainable Development of the United Nations Secretariat (DPCSD) through secondments and contributions from the International Tropical Timber Organization (ITTO), the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).

4. FAO, ITTO, UNDP, UNEP, DPCSD, the World Bank and the secretariat of the Convention on Biological Diversity are effectively collaborating in supporting the work of the Panel through the informal High-Level Inter-Agency Task Force on Forests.

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* E/CN.17/1996/1.

96-08337 (E) 160496 170496

5. The Panel's work is entirely funded from extrabudgetary resources and a trust fund has been established for voluntary contributions. To date, generous financial contributions have been received from Australia, Canada, Finland, Norway, Switzerland, the United States of America and ITTO. In a decision taken at its second session, the Panel expressed its appreciation to those Governments and organizations that had made generous voluntary contributions to support the work of the Panel and its secretariat, and bearing in mind the fact that its work, as envisaged by the Commission and the Economic and Social Council, largely depended on the provision of extrabudgetary resources, invited all interested Governments and organizations to consider supporting the Panel with additional voluntary contributions.

6. The following Governments and organizations are supporting the work of the Panel through initiatives and contributions involving expert groups, seminars, conferences, studies and background papers: Australia, Portugal/Cape Verde/ Senegal, Denmark/South Africa/UNDP, Finland, Germany, Germany/Indonesia, Sweden/Uganda, Norway, Switzerland/Peru, Japan/Canada and the United Kingdom of Great Britain and Northern Ireland.

7. At its second session, the Panel recommended to the Economic and Social Council, through the Commission, the adoption of a draft decision approving the Panel's request to hold its third session in Geneva from 9 to 20 September 1996 and its fourth session in New York for two weeks in 1997 and its request that provision be made for two sessional working groups to meet simultaneously during its third and fourth sessions.

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CROSS-SECTORAL ISSUES, WITH PARTICULAR REFERENCE TO THE CRITICAL ELEMENTS OF SUSTAINABILITY

Note verbale dated 8 April 1996 from the Permanent Mission of the United States of America to the United Nations addressed to the Secretariat of the United Nations

In accordance with General Assembly resolution 49/112 on support for the Global Learning and Observations to Benefit the Environment (GLOBE) Program, the Government of the United States of America is pleased to submit to the secretariat responsible for the Commission on Sustainable Development within the Department for Policy Coordination and Sustainable Development a report on the implementation of the GLOBE Program (see annex).

In its first year of operation, the GLOBE Program has over 30 partner countries involving thousands of students world wide in environmental science and education. We would appreciate the assistance of the United Nations Secretariat in distributing the report to the members of the Commission on Sustainable Development for their consideration at the fourth session of the Commission.

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* E/CN.17/1996/1.

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Annex

Report to the Commission on Sustainable Development on the GLOBE Program

(Global Learning and Observations to Benefit the Environment)

The United Nations General Assembly Resolution 94/112 supporting the GLOBE Program invited Governments to "communicate...to the Commission on Sustainable Development...on their participation in the GLOBE Program." This report is in response to that invitation.

Program Description

The GLOBE Program is a hands-on, international environmental science and education program. The program is school-based, involving both primary and secondary schools. GLOBE brings together students, teachers, and scientists from around the world to enhance the collective awareness of individuals throughout the world concerning the environment, increase scientific understanding of the Earth, and help all students reach the highest standards in science and mathematics education.

Students at all GLOBE schools throughout the world make environmental measurements at or near their schools; report their observations to a GLOBE data processing center; receive and use vivid environmental images created from their data and data from other GLOBE schools around the world; and study the environment by relating their observations and the resulting environmental images to broader environmental topics. All GLOBE activities are conducted under the guidance of GLOBE-trained teachers.

The GLOBE initiative was announced on Earth Day 1994 by U.S. Vice President Al Gore, and the GLOBE Program was initiated on Earth Day 1995. To date, over 30 nations have formally joined the program and approximately 3,000 schools have been identified to participate. In less than one year of operation, over 150,000 elements of environmental data have already been reported. Additional countries are planning to become formal GLOBE partners in the near future and are in the process of negotiating GLOBE agreements with the U.S. Over 100 nations have expressed interest in participating. (List of participating and interested nations is attached.)

U.S. Program

Students at all levels (K-12) in over 2,000 schools in all 50 U.S. states, Puerto Rico and the Marianas Islands are participants in the GLOBE Program. U.S. schools join GLOBE by registering and sending a teacher to a GLOBE teacher training workshop. U.S. GLOBE teacher training workshops are held year-round to prepare teachers to supervise their students' GLOBE activities. The U.S. GLOBE Program is managed as an interagency program involving six U.S. Government agencies, led by the United States National Oceanic and Atmospheric Administration (NOAA). In addition, GLOBE is a public/private partnership involving the Foundation for Global Environmental Education, a private, non-profit foundation. This public/private collaboration seeks to increase private sector support for and involvement in the GLOBE Program, both in the U.S. and internationally.

Partner Country Involvement

As of March 1996, 32 nations throughout the world had joined the GLOBE Program. International participation in GLOBE is conducted through bilateral agreements between the United States and its partner nations. In consultation with its international partners, the U.S. provides the program infrastructure, including development and maintenance of educational materials, scientific protocols and computer and communications systems. Each participating country manages the GLOBE Program in its schools, including ensuring that its schools have scientific instruments for taking GLOBE measurements, and wherever possible, that students have access to classroom computers and Internet communications. However, it is recognized that the diversity of technology accessible by schools worldwide may require, in some cases, that environmental measurements be reported via e-mail or in hardcopy. In the latter case, the nation's GLOBE Country Coordinator is responsible for reporting such schools' measurement data to the GLOBE data processing center via the Internet. In addition to government support, many countries have secured contributions from private corporations and non-profit organizations to provide their schools with the resources necessary to participate in GLOBE.

Networking Student-Scientists

The GLOBE Program promotes international communication, collaboration and understanding among young people throughout the world. Fundamental to the GLOBE Program is the sharing of student-generated environmental data and resulting global images among students and scientists. (Figure 1.) The complete archive of data reported by every GLOBE school is available on the World Wide Web, making the data from, for example, Belgium and the Netherlands, freely and publicly available to all GLOBE students and to the international science community.

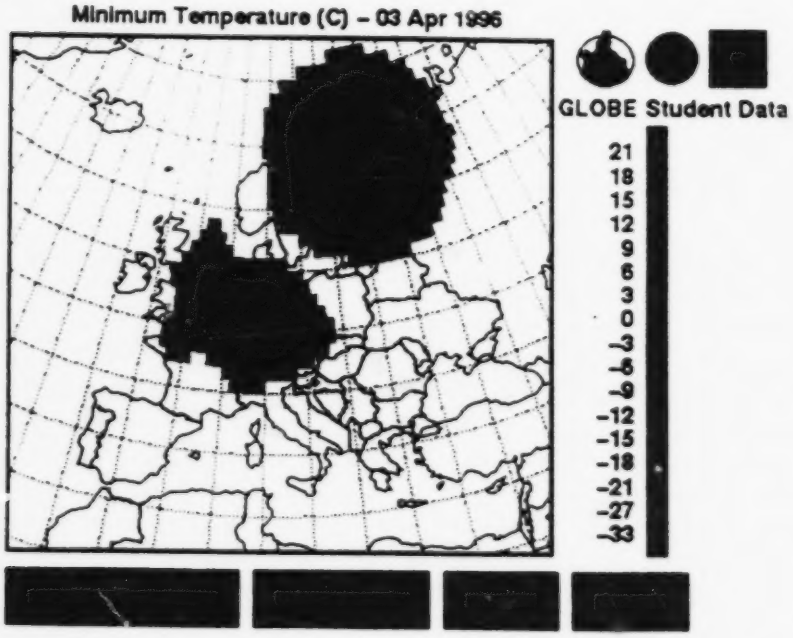

Figure 1

Contour maps are available for all regions providing enough daily measurements to perform the interpolation. Additional regions will be added as we receive enough daily measurements.

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GLOBE provides the opportunity for students to learn about other countries involved in GLOBE. The GLOBE Country Pages on the Student Data Server provide a list of GLOBE schools in each country, information about the GLOBE Points of Contact and Country Coordinators, links to interesting World Wide Web sites about each country, and a gallery of images of each country. For example, Croatia's GLOBE Country Page links to two Web sites developed and maintained by Croatia about its history, culture, and geography. Additionally, if a country has developed its own GLOBE Homepage, it is made accessible by a link from that country's GLOBE Country Page. For example, Germany's GLOBE Homepage includes links to information about various GLOBE events in Germany, information about the sponsoring organization in Germany, and technical guidelines for German GLOBE schools.

Some countries have expanded on the networking nature of GLOBE. Australia, for example, has developed a communications mechanism for GLOBE teachers, called AUSGLOBE, which functions as a simple, informal way for teachers to share information and suggestions relating to GLOBE and for the Country Coordinator to provide updates to Australian GLOBE teachers. The GLOBE Country Coordinator for the Czech Republic has developed a newsletter to keep Czech GLOBE teachers apprised of new developments. Additionally, since many Czech teachers do not have access to the World Wide Web, many global images based on student-derived data are made available in the newsletter.

GLOBE offers an opportunity for international scientists to communicate with students about their research. The Scientist Corner on the GLOBE Student Data Server provides biographical information about each of the GLOBE Principal Investigator scientists and educators, focusing on their areas of research. Additionally, Principal Investigators and other guest researchers develop reports about their areas of study and how the GLOBE measurements contribute to their scientific investigations.

GLOBE fosters regional collaboration through International Training Workshops. Employing a train-the-trainer structure to prepare partner countries for GLOBE implementation, the week-long International Training Workshops bring together Country Coordinators and teachers from one or more regions to prepare them to implement GLOBE in their own countries. For example, the Russian Ministry of Education and the Ministry of Environmental Protection sponsored an International GLOBE Training Workshop for Country Coordinators and teachers from Russia, Kazakstan, Kyrgyzstan, and Moldova. This workshop laid the foundation for future partnerships among workshop participants. Other International Training Workshops have been held in Uruguay for participants from Uruguay, Bolivia, and Argentina; in Senegal for Senegalese and Beninese participants; in the Czech Republic for participants from throughout Europe, Asia and the Middle East; and in Miami, Florida, for participants from many countries including Turkey, China, El Salvador, and Egypt. As a result of these workshops, trainers were prepared to return to their countries to organize and run GLOBE training workshops for their teachers to enable them to supervise their students' GLOBE activities. Such teacher training workshops have been held in over a dozen countries, including Israel, Austria, Finland, and Norway. Several partners, including Greece, Tunisia, and Romania, have identified schools that will participate in the program and plan to attend international training workshops in the near future.

GLOBE also provides an information clearinghouse for interesting GLOBE events around the world. The GLOBE Bulletin on the Student Data Server alerts GLOBE students and teachers to new GLOBE features as well as to current GLOBE-related activities. For example, Argentine President Carlos Menem wrote a letter to all GLOBE students congratulating them for their involvement in the program. This letter was made available to GLOBE students using the GLOBE Bulletin. Additionally, when Irish President Mary Robinson visited Cabinteely Community School in Dublin for a GLOBE demonstration, a GLOBE Bulletin welcomed her to the school and to GLOBE. As new GLOBE partner countries join the program, for example Chad and Morocco, they are welcomed in the GLOBE Bulletin.

GLOBE provides recognition to its schools for exceptional accomplishments. GLOBE STARS recognizes individual schools for reporting data for the first time, for providing large numbers of observations, for doing interesting things in their GLOBE implementation, and for making the news. For example, GLOBE STARS highlighted Japan's 28 schools and Junior Eco Clubs which are reporting GLOBE data on a regular basis. The Junior Eco Clubs are national clubs with over 35,000 student members learning about environmental issues and are a unique aspect of Japan's GLOBE implementation. (Figure 2.) GLOBE STARS also highlighted the first African data reports from Benin. (Figure 3.)

GLOBE STARS

GLOBE STARs in Japan

Japan officially joined the GLOBE program in 1995 and, to date, 21 schools have been identified to participate in GLOBE. In addition, many of the Japanese GLOBE students are part of a national environmental program for young people called Junior Eco Clubs. Over 35,000 students belong to Junior Eco Clubs. In these clubs, young people learn about their environment and how best to take care of it. Seven Junior Eco Clubs have joined GLOBE.

A newspaper in Japan, The Yamanashi Nichinichi Shibun, published a story about the GLOBE activities of students in the Yamanashi Prefecture, a region near Mt. Fuji. The students, featured in the article, are members of the Koufu Junior Eco Club, the Eco Club Oshino, and the Sudama Junior Eco Club. Students began their GLOBE activities by measuring air temperature and water pH in a nearby river. They will be using GLOBEMail to compare their data with Japanese GLOBE students in Istabashi City (pictured here), Fukuoka City, and all over the world.

Figure 2

GLOBE Stars in Benin

Congratulations to Benin, the first GLOBE country on the African continent to begin reporting data! Benin joined GLOBE in April 1995 when the Minister of Education, Mr. Karim Deamene, and then-United States Ambassador to Benin, the Honorable Ruth Davis, signed an agreement in a special ceremony in the capital city, Cotonou.

Beninese teachers, pictured here, were trained in the GLOBE measurements at an August 1995 workshop in Dakar, Senegal and have introduced GLOBE to their students at nine schools throughout this West African country. Students began making observations in December 1995. The first Beninese school to report data, Ecole Primaire Mandina/A, was assisted by the Office of the Mayor of Parakou and the United States Peace Corps.

The Ministry of Education is continuing to oversee development and expansion of the GLOBE program in Benin under the leadership of Mr. Aliyou Bello.

Figure 3

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GLOBE Science

GLOBE students around the world take environmental measurements in the following research areas: Atmosphere/Climate, Hydrology and Soils, and Biology/Land Cover. Following is a list of the initial core GLOBE environmental measurements and the scientific instruments required to make these measurements. As the GLOBE Program evolves, additional measurements will be added to this core list and optional measurements will also be added.

Atmosphere/Climate

Air Temperature	Max/Min Thermometer
Precipitation	Rain Gauge
Cloud Cover/Type	Cloud Charts

Hydrology/Soils

Water pH	pH Paper, pH Pen, or pH Meter
Water Temperature	Thermometer
Soil Moisture	Gypsum Block Sensors and Soil Moisture Meter

Biology/Land Cover

Habitat Study	Compass and Measuring Tape
Tree Height	Clinometer
Tree Canopy	Densiometer
Tree Diameter	Diameter Tape
Species Identification	Dichotomous Keys

The long-term GLOBE science measurements and their accompanying educational activities are designed and developed by nine teams comprised of scientists and educators. The nine Principal Investigator teams are encouraged to include scientists and educators from other countries. In addition, it is anticipated that international scientists will be Principal Investigators for GLOBE measurements expected to be added in the future.

It is important to recognize that real science takes time to develop. GLOBE data has been collected and reported for only one year. However, teams of scientists are already working with the GLOBE data, adding it to other sources of data, and formulating and testing new hypotheses about the environment. GLOBE scientists are confident that the scientific literature will very soon reflect worldwide GLOBE data as a major source of environmental information.

One hundred seventeen countries have expressed interest in GLOBE.
32 countries have signed agreements and joined the Program

Africa (22)

Benin•
Botswana
Cape Verde
Chad•
Côte d'Ivoire
Eritrea
Ethiopia
Gambia
Ghana
Guinea
Kenya
Mali
Mauritania
Namibia
Nigeria
Senegal•
South Africa
Tanzania, United Republic of
Togo
Uganda
Zambia
Zimbabwe

Asia and the Pacific (22)

Australia•
Bangladesh
Brunei Darussalam
China•
Hong Kong
India
Indonesia
Japan•
Korea, Republic of•
Lao People's Democratic Republic
Malaysia
Marshall Islands
Micronesia (Federated States of)
Mongolia
Nepal
New Zealand
Pakistan
Papua New Guinea
Philippines
Sri Lanka
Taiwan Province of China
Thailand

Central and South America (19)

Argentina•
Bahamas
Barbados
Bolivia•
Brazil
Chile
Costa Rica
Dominican Republic
Ecuador
El Salvador•
Guatemala
Honduras
Nicaragua
Panama
Peru
Suriname
Trinidad and Tobago
Uruguay•
Venezuela

Middle East and North Africa (10)

Egypt•
Israel•
Jordan
Kuwait
Morocco•
Oman
Syrian Arab Republic
Tunisia•
United Arab Emirates
Yemen

North America (2)

Canada
Mexico

Europe (42)

Armenia
Austria•
Azerbaijan
Belarus
Belgium•
Bulgaria
Croatia•
Cyprus
Czech Republic•
Denmark
Estonia
Finland•
France
Georgia
Germany•
Greece•
Hungary
Iceland
Ireland•
Italy
Kazakstan•
Kyrgyzstan•
Latvia
Lithuania
Luxembourg
Moldova•
Netherlands•
Norway•
Poland
Portugal
Romania•
Russian Federation•
Slovakia
Slovenia
Spain
Sweden•
Switzerland
Tajikistan
Turkey•
Ukraine
United Kingdom of Great Britain and Northern Ireland
Uzbekistan

• Signed GLOBE Agreement (revised 27 March 1996)

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CROSS-SECTORAL ISSUES, WITH PARTICULAR REFERENCE TO THE CRITICAL ELEMENTS OF SUSTAINABILITY

Letter dated 28 February 1996 from the Chargé d'affaires a.i. of the Permanent Mission of the Netherlands to the United Nations and the Chargé d'affaires a.i. of the Permanent Observer Mission of Switzerland to the United Nations addressed to the Secretary-General

The Permanent Mission of the Netherlands and the Permanent Observer Mission of Switzerland to the United Nations have the honour to transmit to you the report of the International Expert Meeting on the Assessment of technological Needs for Sustainability (see annex),** which was held in Scheveningen, Netherlands, from 5 to 7 February 1996. The meeting was jointly organized and sponsored by the Governments of the Netherlands and Switzerland.

The objective of the initiative undertaken by the Netherlands and Switzerland is to facilitate dialogue and exchange experiences regarding national needs assessment as a supporting tool for the improved utilization of environmentally sound technologies in the transition towards sustainable development, in particular in developing countries and in countries in economic transition.

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* E/CN.17/1996/1.

** The annex is being circulated in the language of submission only.

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We would be grateful if you could make arrangements to circulate the attached report as an official document of the Commission on Sustainable Development at its fourth session.

(Signed) Arjan HAMBURGER
Chargé d'affaires a.i. of the
Permanent Mission of Netherlands
to the United Nations

(Signed) François CHAPPUIS
Chargé d'affaires a.i. of the
Permanent Observer Mission of
Switzerland to the United Nations

Annex

Summary Report of the International Expert Meeting on the Assessment of Technology Needs for Sustainability

Scheveningen/The Hague (The Netherlands), February 5-7, 1996.

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Technology
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Preface

This document is a summary report of the "International Expert Meeting on the Assessment of Technological Needs for Sustainability", which was held in The Hague (Scheveningen), The Netherlands, from 5 - 7 February 1996. The meeting was convened to provide a contribution to ongoing discussions on the subject of technology transfer and capacity building, in particular in the framework of the UN Commission on Sustainable Development and the OECD/IEA Climate Technology Initiative.

The meeting was organised by the governments of the Netherlands (Directorate General for Environment/Department of Clean Technologies) and Switzerland (Federal Office for Foreign Economic Affairs/Development Policy Division). About 40 experts representing national governments, international organisations, industry and research institutes, from both the developed and the developing world participated in the expert meeting.

The meeting has resulted in a number of conclusions and recommendations, regarding the use, strategy and methodology of National Needs Assessments for technological capacity building. The conclusions and recommendations have been elaborated into a "Guidance document on NNAs regarding ESTs", which aims to provide guidance on the use of NNAs, to countries or organisations planning to initiate or strengthen their capacity building efforts.

The recommendations and conclusions, as well as the guidance document, are included in the present document. For a list of participants as well as a summary of the discussions and the presentations, reference is made to the full report of the expert meeting on NNAs.

The expert meeting on National Needs Assessment has been a fruitful and pleasant workshop. On behalf of the Netherlands and Swiss governments, the organisers would like to thank all participants for their active and constructive contributions. Also, the organisers wish to thank the Secretariat of the UN Commission for Sustainable Development. Their supportive role in the process has been of great value.

1. Conclusions

1. Having recognised the importance of practical transfer and co-operation projects regarding Environmentally Sound Technologies (ESTs), the meeting convened in order to discuss the use of National Needs Assessments (NNAs) as a tool to improve the utilisation of ESTs in the development process of developing countries and countries in economic transition ([1]). In addition to ongoing technology transfer projects, NNAs should be undertaken to discover less obvious EST-opportunities, which upon implementation will contribute to both socio-economic development and environmental improvement. The ultimate objective of a NNA is to initiate and implement a selected number of priority projects in capacity-building regarding ESTs and transfer of prioritised EST-options.

1.1 Concepts and definitions

2. A National Needs Assessment (NNA) is a tool for the government or other national stakeholders of a particular developing country or country in economic transition (designated as the 'host country') to define a portfolio of capacity building actions and technology transfer projects to be undertaken to facilitate, and possibly accelerate, the development, adoption and implementation of Environmentally Sound Technologies (ESTs).

3. Environmentally Sound Technologies (ESTs) are technologies (hardware and software) which contribute, in the particular national situation, to achieving or restoring the balance between objectives regarding social development, economic growth and sustainable use of natural resources (including protection of the environment).

4. The meeting concluded that the improved utilisation of ESTs in the development process of developing countries and countries in economic transition requires the strengthening and developing of capacities in several fields, in particular: identification of technology shortcomings in available technological options, training of industry, institutional and government leaders, technological R&D institutions and those institutions which facilitate the dialogue between national stakeholders, and education of the public on the importance and need for transition towards sustainable development.

5. The meeting recognised that the transfer of ESTs:

   (a) encompasses transfer of technologies both between and within countries, and modification and adaptation of technologies used elsewhere; and

   (b) involves at least four steps, respectively: (i) creating awareness of the need for ESTs; (ii) developing capacity for the absorption and/or adoption of ESTs, (iii) obtaining information and assessment of technological options, and (iv) implementing technology selection and managing technology changes.

1.2 Added value

6. There is an evolving interest in the use of NNAs, because:

   (a) capacity building regarding ESTs is an essential condition for effective technology transfer to take place;

   (b) capacity building efforts are most likely to be successful once these efforts are based on the result of a solid assessment of the technology needs of the host country and once this needs assessment is endorsed by the most important stakeholders of the respective host country;

---

[1] *The particular developing country or country in economic transition for which the NNA is undertaken is considered to be the 'host country' for that particular NNA.*

(c) it may contribute to obtain participation of the private sector in its entity as owner of most technologies and source of finance, in the transfer of ESTs to, among and within developing countries and countries in economic transition;

(d) it may contribute to obtaining participation of those sectors in which there is a large public sector involvement (like agriculture, energy, etc.); and

(e) it may contribute to exploit the potential of ESTs to contribute to the transition towards sustainable development in developing countries and countries in economic transition.

7. The meeting identified among others the following **added values** for NNAs, provided the NNA is properly followed up by capacity building actions and technology transfer projects:

(a) to the ***national government of the host country***: The NNA generates a portfolio of (i) capacity building actions which facilitate, and possibly accelerate, the development, adoption and implementation of ESTs, and (ii) technology transfer projects regarding ESTs;

(b) to the ***international community and donor agencies***: The NNA presents an opportunity (1) to emphasise the 'demand-driven' approach and tailor international capacity building actions regarding ESTs to the actual needs of the beneficiaries in the host countries, and (2) to prepare technology transfer projects regarding ESTs which can be undertaken by the private sector and thereby use the potential technology offer and financing capacities of the private sector;

(c) to the ***different stakeholders in the host country***: The NNA-process and its follow-up offers to the different stakeholders, such as private sector, scientific and R&D community, NGOs, etc., in key sectors, such as agriculture, manufacturing, etc., in the host country an opportunity to enter into a national dialogue regarding socio-economic and environmental strategies and to participate in the planning and execution of capacity building actions and technology transfer projects regarding the uptake of ESTs; and

(d) A NNA is undertaken to discover ***less obvious EST-opportunities*** in order to contribute to both socio-economic development and environmental improvement. In bringing different stakeholders together and enhancing dialogue, the NNA could also discover niches for win-win-solutions.

8. The meeting also recognised that additional practical experiences are required to fully explore, and substantiate, the added values of conducting NNAs.

1.3 Methodology

9. The preparation and execution of the NNA, as well as the management of its follow-up, will benefit from a methodology, which outlines the various phases, indicates the expected outcome and facilitates the participation of stakeholders.

10. NNAs may be undertaken in several different ways. The approach is to be tailored to the national circumstances, the anticipated follow-up for the NNA and the objectives of the initiators, project partners and organisers. Before initiating a NNA, a number of strategic choices will have to be made on the basis of the scope of the NNA, the motivation of stakeholders and project partners which will determine among other aspects the entry point for the NNA. In general, a division is possible with respect to the depth (level of detail of the analysis) and width (coverage of socio-economic and/or environmental issues) of the assessment.

On the basis of the experiences gained so far, the meeting concluded that two types of NNA are most likely to be successful ([2]:)

(a) comprehensive-coverage NNA based on comparatively-superficial analysis (designated as type 2 NNA)

and,

(b) partial coverage NNA based on comparatively in-depth analysis (designated as type 3 NNA).

1.4 Strategy

11. The execution of a NNA is only likely to be successful when favourable conditions are met in the host country. These conditions are:

(a) awareness of the socio-economic and environmental benefits of ESTs;

(b) motivation of important, national stakeholders to participate in the NNA-process, including management of its follow-up;

(c) proper qualification of the institutions in charge of the execution of the NNA; and

(d) availability of medium to long term national, socio-economic and environmental planning.

12. The proper follow-up of a NNA calls for concerted action among key players, including the national government of the host country and its agencies, other organised national stakeholders, beneficiaries of the prioritised capacity building actions and technology transfer projects, donor agencies and local NGOs.

13. The meeting concluded that the follow-up of the NNA is most likely to be successful in case:

(a) the execution of the NNA is managed in such a way that it results in strengthening the institutional framework for the implementation of policies and strategies fostering the use of ESTs;

(b) responsibility for co-ordinated implementation and review of follow-up projects is assigned to a high level body, with participation of national stakeholders; and

(c) project partners formulate challenging proposals regarding the prioritised capacity building actions and technology transfer projects.

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[2] *A detailed description of the different types of NNA is given in section 3.3 of the annexed Guidance document on National Needs Assessments regarding Environmentally Sound Technologies for Developing Countries*

2. Recommendations

2.1 General methodology

1. The NNA should be considered as a continuous and iterative process, which can logically be organised in three phases, respectively:

   (a) ***Creating an enabling environment:*** Setting the stage for a NNA-process, by (i) creating favourable conditions, through either awareness raising and communication with stakeholders, and/or execution of pilot projects regarding transfer/acquisition of ESTs; and (ii) defining the NNA-project (problem definition in order to set objectives, define participation of stakeholders, develop the organisational framework and raise necessary funds);

   (b) ***Assessing capacity building needs:*** Actual execution of the assessment tasks through data analysis and consultation of national stakeholders, resulting in a portfolio of prioritised capacity building actions and technology transfer projects; and

   (c) ***Strengthening and developing capacities***: Implementation of the portfolio of prioritised capacity building actions. Such capacity building results in the application of ESTs, the definition and implementation of technology transfer projects regarding ESTs and an ongoing dialogue among national stakeholders, government and financing institutions regarding the implementation of ESTs. This phase also includes review activities in order to sustain the continuous process of assessing capacity building needs regarding the application of ESTs and building prioritised capacities.

2. On the basis of the experiences gained so far, it is suggested to apply the following types of NNAs ([3]):

   (a) ***Comprehensive coverage NNA based on comparatively superficial analysis (type 2)***; in particular
   (i) to develop or broaden general strategies to promote the development, acquisition/transfer, use and dissemination of ESTs or
   (ii) to identify priority socio-economic sectors or environmental problems, in which ESTs are most likely to significantly support the development process of the developing country or country in economic transition;
   or

   (b) ***Partial coverage NNA based on comparatively in-depth analysis (type 3)***; in particular to prepare a detailed action plan for the improved utilisation of ESTs in the development of a particular socio-economic sector or in the abatement of a particular environmental problem.

   In order to exploit the potential of NNAs, it is also suggested to apply NNAs in a tier-wise mode, with alternatively type 2 NNA and type 3 NNA. Whether it is most appropriate to start with a type 2 NNA or with a type 3 NNA depends on local objectives and circumstances. A type 2 NNA could most usefully be undertaken to develop national strategies and plans, whereas a type 3 NNA based on these plans could define concrete actions for capacity building as well as define specific technology transfer projects.

3. The NNA-process should be 'transparent' and 'participatory'. It should reflect the views of national stakeholders involved as well as the compatibility with national policies, in particular with regard to priority setting between technological options, priority setting among environmental problems and priority setting regarding options for capacity building.

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[3] *A detailed description of the different types of NNA is given in section 3.3 of the annexed Guidance document on National Needs Assessments regarding Environmentally Sound Technologies for Developing Countries*

2.2 Phases of the NNA-process

Phase 1: Creating an enabling environment

4. Creating an enabling environment is important for enhancing the effectiveness of the NNA-process. Thus, it is recommended to:

- conduct a survey among stakeholders (including industry, government, NGOs, R&D community etc.) in order to identify which (policy-) initiatives are already undertaken and to take the results of these initiatives into account while defining the NNA;
- assure that local institutions have the ownership of the execution of the NNA;
- identify a strong and committed local actor to take the lead in the execution of the NNA;
- ensure participation of national stakeholders throughout the NNA-process;
- tailor the objectives of a particular NNA to long term environmental and socio-economic strategies and policies, provided that such strategies and policies are the result of a participatory process within the host country;
- build capacity in local institutions to undertake and manage the NNA-process; and
- make a preliminary assessment of the potential for funding of follow-up actions from resources available in the national and international, public and private sectors and tailor follow-up actions to the realistic funding opportunities.

5. The organisers of the NNA should explore potential funding opportunities to be able to undertake at least a few selected follow-up projects identified by means of the NNA.

Phase 2: Assessing capacity building needs

6. In order to ensure implementation of follow-up actions, the NNA should sustain awareness and commitment of national stakeholders and contribute to institutional capacity building. This cannot be done through a blue print approach; the approach should be adapted to nationally and internationally available information sources, match socio-economic conditions, use existing networking structures and technological and organisational capacities. In general, the assessment phase should include three main assessment tasks, respectively:

(a) ***Identification and selection of EST needs and opportunities***: Inventory of technological options to alleviate environmental problems and preliminary evaluation of those options on economic, technical, cultural and environmental impacts in order to select the most promising technological options;

(b) ***Assessment of capacities:*** Assessment of the barriers and incentives regarding the application of the ESTs and formulation of capacity building needs; and

(c) ***Setting priorities for capacity building actions and technology transfer projects***: Comparative evaluation of capacity building needs and prioritisation of follow-up actions (including capacity building actions and technology transfer projects).

7. The execution of the first assessment task encompasses both an inventory of ESTs and the selection of those ESTs relevant in light of the objectives of the NNA.

The **inventory** should be based on the results of the following three inter-related surveys:

- ***Survey of environmental problems:*** Covering target national or regional environmental problems (including inefficient use of resources) and anticipated developments therein;
- ***Survey of socio-economic conditions:*** Covering socio-economic conditions under which the target socio-economic sectors are operating and - whenever feasible - the anticipated developments in socio-economic conditions; and
- ***Survey of appropriate technological options:*** Covering appropriate technological options to reduce a particular environmental problem caused by a particular socio-economic sector.

With a view to identifying the most appropriate EST needs and opportunities, the **selection process** should take into consideration:

- The perceived societal goals, which could determine the choice between an environmental approach (starting with the survey of environmental problems and opportunities and giving first priority to environmental impact) or socio-economic approach (starting with the survey of socio-economic conditions and giving first priority to socio-economic development);
- Potential for using locally-available, resources, technologies and craftsmanship;
- Openness to emerging environmental technologies;
- Potential for win-win solutions;
- Potential for overcoming institutional and/or cultural barriers to sustainable development; and
- Costs.

8. The execution of the second assessment task encompasses both the assessment of capacities to promote and apply the prioritised EST-options, and the identification of capacity building needs regarding the prioritised ESTs. The assessment should concentrate on **technological capacities** (ability to develop, test, manufacture, operate and evaluate technical installations), **training capacities** (ability to develop, deliver and evaluate training, education and extension work to relevant target groups), **institutional capacities** (ability to network and co-operate among different stakeholders (including financial institutions)) and **government capacities** (ability to prepare and implement policies, develop enforcement strategies, etc.).

9. The third assessment task requires the elaboration of the capacity building needs in 'ideas' for capacity building actions and technology transfer projects, in order to generate commitment among national stakeholders and to ensure proper follow-up of the NNA. A comparative evaluation of the project options should take place in order to select priority follow-up actions. The evaluation should include (i) the anticipated contribution to socio-economic development, (ii) the anticipated contribution to environmental improvement and (iii) the anticipated commitment of national stakeholders.

Phase 3: Strengthening and developing capacities

10. A mechanism for the periodic review of the implementation status, results and experiences of the prioritised capacity building actions and technology transfer projects should be established in order to ensure their effective implementation and in order to keep the NNA-process evolving.

11. Participants involved in the NNA-process should elaborate a few ideas for capacity building and technology transfer into more detailed project proposals in order to facilitate fund-raising in the national and international public and private sectors.

12. The government of the host country should ensure that the NNA will be managed in such a way that it results in strengthening of the institutional framework for the formulation and implementation of policies and strategies that foster the use of ESTs.

13. The government of the host country should take the lead in the co-ordinated implementation of the follow-up actions to the NNA, associated with major stakeholders. This should include amongst others:

- Initiation of prioritised technology transfer projects and supervision of prioritised capacity building actions;
- Co-ordination with private and public financing institutions and donor agencies; and
- Preparation and implementation of policies that foster the use of ESTs.

2.3 Promotion of the use of NNAs to improve the utilisation of ESTs in the development process of developing countries and countries in economic transition

14. Governments of developed and developing countries and countries in economic transition are encouraged to continue and expand the application of NNAs, using national and regional environmental action plans or sustainable development strategies, where existing.

15. International organisations, United Nations Organisations and the Organisation for Economic Co-operation and Development (OECD), national, regional and international financial institutions, Secretariats of the various international conventions, national governments and donor agencies, as well as regional organisations are encouraged to use the results and experiences gained with NNAs, in designing their policies and investment decisions. NNAs should also be used as an instrument for co-ordination among these agencies, institutions and organisations regarding EST-programmes.

16. The CSD should keep the issue of NNA as a priority issue on its agenda. Countries and international organisations are requested to provide information to the CSD on the execution and project implementation of NNAs in order to support the Commission in monitoring and evaluating the efficiency of NNAs for the improved utilisation of ESTs in the development process of developing countries and countries in economic transition.

17. An expertise network should be established and maintained among experienced and interested national, regional and international institutions in order to facilitate, among others:

- Execution and implementation of NNAs regarding ESTs in developing countries and countries in economic transition;
- Monitoring and evaluation of the efficiency of NNAs for improving the utilisation of ESTs in the development process of developing countries and countries in economic transition; and
- Compilation of guidelines and methodologies for NNA that have proven effective under specific conditions, for example, in the form of training kits, and disseminating them, e.g. through expert meetings, training seminars, travelling workshops etc. to national stakeholders.

18. Development co-operation agencies of donor countries are urged to adopt policies which establish the promotion of NNAs and capacity building regarding the use of ESTs as a distinct and substantive programme. Consistent

with this emphasis, they should also increase the allocation of financial resources to undertake NNAs and to transfer ESTs.

19. As many providers and recipients of ESTs are private enterprises, national and international public agencies should make a determined effort to establish a dialogue with business associations in industrialised and developing countries to involve private sectors in NNAs. Through their participation, private sectors may explore investment opportunities generated through the NNA and enhance technology co-operation.

Annex 1:
Guidance document on National Needs Assessments (NNAs) regarding Environmentally Sound Technologies (ESTs) for Developing Countries

1 Introduction

This document proposes a framework for National Needs Assessments (NNAs) regarding the improved utilisation of Environmentally Sound Technologies (ESTs) in the development process of developing countries and countries in economic transition. It aims at clarifying concepts, functions and possible applications in order to favour the application of NNAs. It is based on the results of the *International Expert Meeting on the Assessment of Technology Needs for Sustainability*, held in Scheveningen (The Hague, The Netherlands, February 5-7, 1996) and the preparatory work preceding it ([4]). The description of the framework is organised as follows:

1. Description of the main concepts regarding NNAs on ESTs and target groups (chapter 2);
2. Analysis of the added values of undertaking NNAs with suggestions for the effective use of NNAs to improve the utilisation of ESTs in the development process (chapter 3);
3. Outline for a methodology, which provides a framework for the preparation and execution of the NNA and management of its follow-up and specifies the activities which have to be undertaken in each phase of the NNA-process (chapter 4);
4. Closing remarks which summarise issues regarding the application of NNAs and success factors derived from NNAs undertaken so far (chapter 5).

2 Description of main concepts and target groups

2.1 National Needs Assessment

National Needs Assessments (NNAs) are a tool to improve the utilisation of Environmentally Sound Technologies (ESTs) in the transition towards sustainable development in developing countries and countries in economic transition ([5]). NNAs are undertaken to favour the use of those technologies in the development process which, in the particular national situation, are most appropriate to strike a reasonable balance between social concerns, economic growth and sustainable use of natural resources (including the protection of the environment) in achieving sustainable development objectives.

> *"A National Needs Assessment (NNA) is a tool for the government or other national stakeholders of a particular developing country or country in economic transition (designated as the 'host country'), to define a portfolio of capacity building actions and technology transfer projects to be undertaken to facilitate, and possibly accelerate, the development, adoption and implementation of Environmentally Sound Technologies (ESTs)".*

The interpretation given here to NNA, goes beyond a 'plain' assessment of needs. It includes a participatory priority setting process in order to arrive at priority capacity building actions and priority technology transfer projects. National needs regarding the use of ESTs are, in turn, determined by factors such as:

- *socio-economic factors*: importance of various economic sectors, expected social and/or economic developments such as industrial growth, income generation, employment etc.;
- *factors related to the scientific and technological infrastructure*: physical infrastructure, types and status of technology used, existing level to produce scientific inventions and technological innovations, local capacities to assess, adapt, maintain and improve technologies, including those transferred from abroad, etc.;

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[4] See Berkel, R. van et all (1996), National Needs Assessments regarding Environmentally Sound Technologies for Developing Countries, methodology and comparative evaluation, Report 96-02, IVAM Environmental Research, University of Amsterdam, The Netherlands

[5] The particular developing country or country in economic transition for which the NNA is undertaken is considered to be the 'host country' for that particular NNA

- *factors related to natural resources and the environment*: access to renewable and non renewable resources, climatological factors, vulnerability of local ecosystems (e.g. land degradation, air and water pollution), etc.;
- *regulatory and institutional factors:* development stage of environmental policies (including diversity of policy instruments), adopted regulatory framework and enforcement strategies and level of compliance;
- *demographic factors*: size and composition of the population, expected demographic developments, etc..

The interpretation given here to NNA, merges elements of *'technology needs assessment (TNA)'* and *'technology assessment (TA)'*. TNA deals with the identification of technological needs on the part of the *research community* (involved in technology development), and on the part of the *production community* (involved in technology utilisation). Once production problems, or technology needs, have been assessed, the TNA continues with a deliberate effort to identify the required knowledge, organisational arrangements, and hardware to cope with these production problems. On the other hand, Technology Assessment (TA) aims at evaluating prospects and risks associated with particular technologies. It covers a process of systematic evaluation of the social, economic, environmental and cultural impacts of a particular technology or activity of technological development. TA can contribute to the selection of technologies, which contribute to meeting the technological needs identified with a TNA, while minimising social and environmental trade-offs. As with TNA, the NNA starts with the assessment of technology needs, generally at a comparatively high level of abstraction. However, the NNA then adds a selection step, before going into the identification of the required knowledge and organisational arrangements, whereas a TNA does not include such selection step. The selection step uses elements of TA to select those technologies or technological developments, which are 'environmentally-sound' under the given circumstances. Consequently, the NNA results in the inventory of capacities to be created to improve the utilisation of ESTs for meeting national technology needs, whereas a regular TNA would result in the inventory of capacities to be created to improve the utilisation of technology in general.

2.2 Environmentally Sound Technologies (EST)

EST is a relative concept in that the term 'environmental soundness' cannot be attributed to any specific technology or specific group of technologies. This implies: (a) that what may be perceived as environmentally sound today may not necessarily be sound tomorrow; and (b) that any technology must be viewed in relation to the socio-economic, cultural and environmental conditions, thereby creating an interaction whose outcome needs to be constantly assessed.

> *"Technologies generally consist of both hardware (actual technical installations) and software (management systems in which these operate) components and are, generally, considered* ***environmentally sound*** *once they contribute best, in the particular national situation, to achieving, or restoring, the balance between objectives regarding social development, economic growth and sustainable use of natural resources (including protection of the environment)."*

This operationalisation of ESTs fits within the framework of the descriptions given in Agenda 21.

The division between 'EST' and 'non-EST' is governed by the *application* of the technology rather than the *specific types* of hardware (actual technical installations) or software (management system in which these installations operate). A particular technology may have both 'EST' as well as 'non-EST' applications. EST can be interpreted as the application of a particular technology ('solution') for a particular (part of a) socio-economic sector ('source of pollution') in order to reduce a particular environmental stress ('impact'). ESTs are most often categorised on a scale from *'preventive'* to *'reactive'*. Generally speaking, preventive environmental technologies avoid the generation of waste and emissions in the first place through modification and/or substitution of the pollution source, whereas reactive environmental technologies are applied to minimise the environmental impact of wastes and emissions after their generation.

2.3 Capacities

In consistency with the main objective of a NNA to improve the utilisation of ESTs in the transition towards sustainable development in developing countries, the term 'capacity', as used in the context of this guidance document, is interpreted as follows:

"Capacities which have to be strengthened, or possibly even developed, in order to facilitate, and possibly accelerate, the co-ordinated and planned development, acquisition/transfer, use and diffusion of ESTs."

Technology transfer regarding ESTs proves to be a process involving the following steps: (i) creating awareness of the need for ESTs; (ii) developing capacity for the absorption and/or adoption of ESTs; (iii) obtaining information and assessment of technological options; and (iv) implementing technology selection and managing technological change. Capacity building regarding ESTs is thus an essential condition for effective transfer and use of ESTs to take place. It includes training and professional development, as well as developing and enforcing a policy framework and regulatory strategies, creating awareness among general public and national stakeholders, providing facilities for organised stakeholders, institutions, NGOs and R&D communities to promote ESTs, etc..

The improved utilisation of ESTs thus calls for development of capacities in several fields, including - but most likely not limited to -:

- *technological capacity*: ability to develop, test, manufacture, operate and evaluate (technical) installations, like production plants, monitoring equipment etc.. The technological capacity includes the ability to conduct activities like Technology Needs Assessments, Technology Tracking and Technology Assessment;
- *training capacity*: ability to develop, deliver and evaluate training and education to various target groups within society. The training concept may receive a broad interpretation including elements of extension work, continuous education of various professional groups etc.;
- *institutional capacity*: ability to network and co-operate among different stakeholders (for instance industry, households, farmers, research & technology institutions, NGOs etc.) in order to serve common interests (like environmental protection);
- *government capacity*: ability to prepare, implement and enforce policies in different policy domains (like environmental protection, technology infrastructure, socio-economic development, education and training etc.).

The NNA assesses to what extent in each of these fields capacities have been developed which specifically enable the improved utilisation of ESTs. The NNA outcome is a programme of prioritised capacity building actions and technology transfer projects.

2.4 Target group and beneficiaries

Most importantly the NNA should address and support decision makers, which in turn can use the results of the NNA to improve the utilisation of ESTs in the development process of the host country. These decision makers may be in the government, but may also be individuals or organisations outside the government. Appointing the national government and/or organised stakeholders at the national level as the target group, clearly reflects the need to adopt national policies and strategies to promote ESTs. As this is generally not an easy task to achieve directly, it is desirable to acknowledge the importance of an intermediate target group of decision makers. The NNA-process may enable such individuals or organisations to become champions for the promotion of ESTs, which in turn enables them to influence the national government and modify national policies.

The follow-up to the NNA is to result in strengthening and developing capacities to enable the improved utilisation of ESTs. This may take place in governmental organisations as well as in institutions outside the administration (such as universities, technology and training institutes, extension centres, financing institutions, industry associations, chambers of commerce etc.). The institutions in which capacity building is to take place in the follow-up of the NNA, are considered the *target beneficiaries* of the NNA.

The execution of the NNA may be financed by the national government of the host country, in collaboration with involved stakeholders, or by funds external to the host country, such as grants from multi-lateral organisations or donor agencies of developed countries. The organiser and financier of the NNA-process may play a role in the creating an enabling environment for the NNA-process and supervising the execution of the NNA.

Within the frame of this guidance document, it is assumed that countries in economic transition, in particular countries in Central and Eastern Europe, may benefit in a similar way from the execution of a NNA as developing countries. Therefore no distinction is made between these categories. At the same time, NNAs could be a useful instrument for developed countries as well. However, the more matured institutional set up for the environmental

policies in developed countries, most likely already enables NNA-like processes. This guidance document is therefore focused on the application of NNAs for developing countries, including countries in economic transition.

3 Strategic considerations regarding application of NNAs for the improved utilisation of ESTs

3.1 Added value of the NNA-process

In addition to, and support for, ongoing technology transfer projects, NNAs may be undertaken to discover less obvious EST-opportunities, which upon implementation will contribute to both socio-economic development and environmental improvement. The ultimate objective of a NNA is to initiate and implement a selected number of priority projects in capacity-building regarding ESTs and transfer of prioritised EST-options.

The interest in the use of NNAs is evolving, because:

- capacity building regarding ESTs is an essential condition for effective technology transfer to take place;
- capacity building actions are most likely to be successful once these actions are based on the result of a solid assessment of the technology needs of the host country and once this needs assessment is endorsed by the most important stakeholders of the respective host country;
- the NNA-process may contribute to obtain participation of the private sector in its entity as owner of most technologies and source of finance, in the transfer of ESTs to, among, and within, developing countries and countries in economic transition;
- the NNA-process may contribute to obtaining participation of those sectors in which there is a large public sector involvement (like agriculture, energy, etc.); and
- the NNA-process may contribute to exploit the potential of ESTs to contribute to the transition towards sustainable development in developing countries and countries in economic transition.

On the basis of the experiences gained so far, it is most likely that the NNA-process has the following added values, provided that the NNA is properly followed up by capacity building actions and technology transfer projects:

- To the ***national government of the host country***, the NNA generates a portfolio of (i) capacity building actions which do facilitate, and possibly accelerate, the development, adoption and implementation of ESTs, and (ii) technology transfer projects regarding ESTs;
- To the ***international community and donor agencies***, the NNA presents an opportunity (i) to emphasise the 'demand-driven' approach and tailor international capacity building actions regarding ESTs to the actual needs of the beneficiaries in the recipient countries, and (2) to prepare technology transfer projects regarding ESTs which can be undertaken by the private sector and thereby use the potential technology offer and financing capacities of the private sector;
- The NNA-process and its follow-up offers to ***different stakeholders in the host country***, such as private sector, scientific and R&D community, NGOs, etc., in key sectors, such as agriculture, manufacturing, etc., in the host country an opportunity to enter into a national dialogue regarding socio-economic and environmental strategies and to participate in the planning and execution of capacity building actions and technology transfer projects regarding the use of ESTs; and
- A NNA is undertaken in order to ***discover less obvious EST-opportunities*** in order to contribute to both socio-economic development and environmental improvement. In bringing different stakeholders together and enhancing dialogue, the NNA could also discover niches for win-win-solutions.

Taking into account the early development stage of the NNA-methodology and the limited practical experiences, it is necessary to continue the application of the NNA-tool, and to evaluate its impact on the improvement of the utilisation of ESTs, in order to fully explore, and substantiate, the added value of conducting NNAs regarding ESTs for developing countries and countries in economic transition.

3.2 General model to improve utilisation of ESTs

The execution of NNAs and management of their follow-up benefits from the development of a methodology which outlines the various phases of the NNA-process, indicates the expected outcome for each of the phases, and specifies the tasks to be accomplished in order to achieve these outcomes. Such a planned approach has the advantage to better

safeguard the involvement of different local stakeholders, initiators of the NNA and potential financial institutions throughout the actual execution of the NNA and the follow-up projects.

The NNA is considered to be a continuous and iterative process, which can logically be organised in three phases, respectively:

1. ***Creating an enabling environment for NNA:*** Setting the stage for a NNA-process, by (i) creating favourable conditions, through either awareness raising and communication with stakeholders, and/or execution of pilot projects regarding transfer/acquisition of ESTs; and (ii) defining the NNA project (problem definition in order to set objectives, define participation of stakeholders, develop the organisational framework and raise necessary funds);
2. ***Assessing capacity building needs:*** Actual execution of the assessment tasks through data analysis and consultation of national stakeholders, resulting in a portfolio of prioritised capacity building actions and technology transfer projects; and
3. ***Strengthening and developing capacities***: Implementation of the portfolio of prioritised capacity building actions and prioritised technology transfer projects. The capacity building actions are to result in the application of ESTs, the definition and implementation of technology transfer projects regarding ESTs and an ongoing dialogue among national stakeholders, government and financing institutions regarding the implementation of ESTs. This phase also includes review activities in order to sustain the continuous process of assessing capacity building needs regarding the application of ESTs and the building of prioritised capacities.

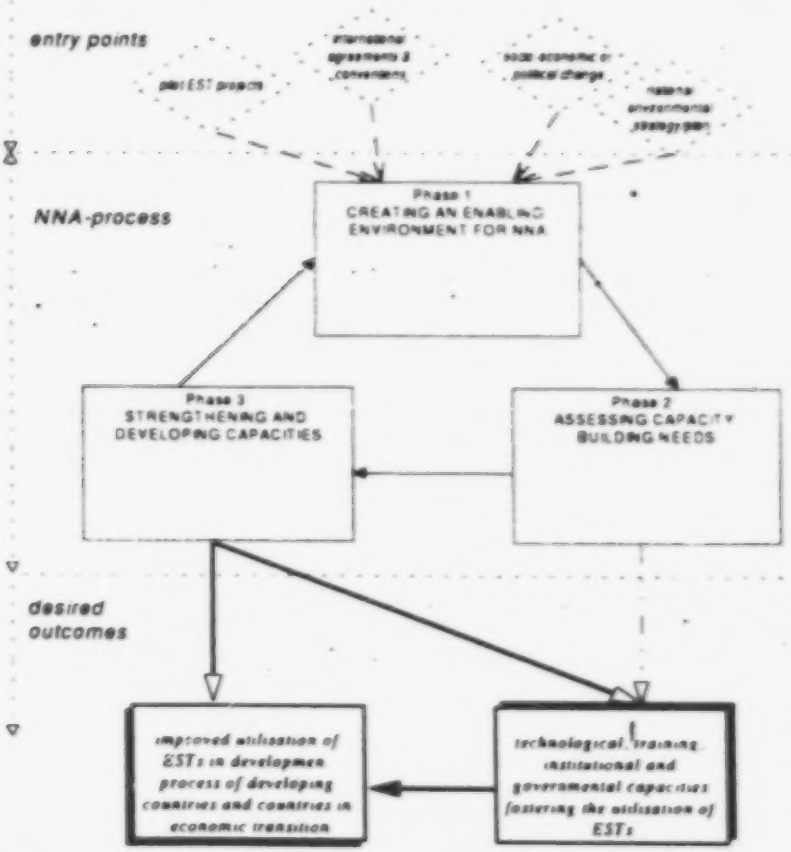
entry points
pilot EST projects
major economic or political change
NNA-process
Phase 1
CREATING AN ENABLING ENVIRONMENT FOR NNA
Phase 3
STRENGTHENING AND DEVELOPING CAPACITIES
Phase 2
ASSESSING CAPACITY BUILDING NEEDS
desired outcomes
improved utilisation of ESTs in developing countries and countries in economic transition
technological, training, institutional and governmental capacities fostering the utilisation of ESTs

Figure 1: General model to improve utilisation of ESTs.

The desired outcome of this NNA-process is the improved utilisation of ESTs in the development process of the host country, which is either achieved directly through implementation of technology transfer projects, or indirectly, through the strengthening and development of capacities which facilitate, and possibly accelerate, the development, adoption and implementation of ESTs. Different activities may actually trigger the initiation of the NNA-process, such as pilot EST technology transfer projects, international agreements and conventions, major socio-economic and/or political changes in the host country, national environmental policies and strategies, etc.. These all create entry-points for the NNA-process and provide the process with legitimacy. This overall model to improve the utilisation of ESTs through a NNA-process is illustrated in figure 1.

3.3 Applications for the NNA-process

Different types of NNAs may fit in general model for NNAs outlined above. Categorisations can be made along the following lines:

- *coverage of the assessment*: the NNA is either characterised as comprehensive (covering all important socio-economic sectors or all important national environmental problems) or partial (geared to a few major environmental problems or socio-economic sectors);
- *level of detail in the analysis*: the analysis of data and consultation of stakeholders for the execution of the NNA can be undertaken at different levels of detail, to be characterised as 'comparatively superficial' and 'comparatively in-depth'.

This results in a two by two matrix of types of NNAs, as shown in figure 2. The example NNA-like activities evaluated in detail (see van Berkel et all, 1996), are also depicted in figure 2.

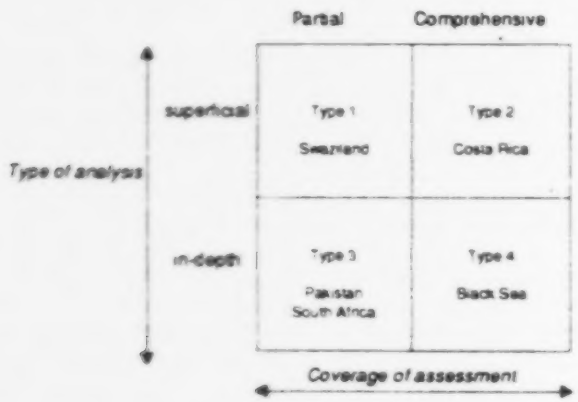

Figure 2: Classification of different types of NNAs.

The experiences gained so far, indicate that two types of NNA are most likely to be successful, respectively:

- comprehensive-coverage NNA based on comparatively-superficial analysis (designated as type 2 NNA); and
- partial-coverage NNA based on comparatively in-depth analysis (designated as type 3 NNA).

Types 1 and 4 are considered less appropriate. The disadvantage of type 1 (partial coverage NNA based on comparatively superficial analysis) is that this type of NNA is not likely to generate additional insights, as compared to normal project appraisal efforts. It is felt that the execution of type 4 (comprehensive coverage NNA based on comparatively in-depth analysis) requires too many resources, thereby delaying the actual acquisition/transfer of ESTs. Additionally, type 4 NNA will result in such a large number of project ideas that it will be complicated to arrive at consensus regarding priority capacity building actions and priority technology transfer projects and to manage the expectations raised by the NNA-process.

On the basis of the experiences gained so far, it is therefore suggested to apply:

- ***Comprehensive coverage NNA based on comparatively superficial analysis (type 2)***: in particular:
  (i) to develop or broaden general strategies to promote the development, acquisition/transfer, use and dissemination of ESTs; or
  (ii) to identify priority socio-economic sectors or environmental problems, in which ESTs are most likely to significantly support the development process of the developing country or country in economic transition; or
- ***Partial coverage NNA based on comparatively in-depth analysis (type 3)***: in particular to prepare a detailed action plan for the improved utilisation of ESTs in the development of a particular socio-economic sector or in the abatement of a particular environmental problem.

In order to exploit the potential of NNAs, it is also suggested to apply NNAs in a tier-wise mode, with alternatively type 2 NNA and type 3 NNA. Whether it is most appropriate to start with a type 2 NNA or with a type 3 NNA depends on local objectives and circumstances. A type 2 NNA could most usefully be undertaken to develop national strategies and plans, whereas a type 3 NNA based on these plans could define concrete actions for capacity building as well as define specific technology transfer projects.

3.4 International co-operation and co-ordination

Figure 1 shows that international agreements and conventions, as well as national plans and communications prepared in the framework of ongoing international co-operation programmes regarding ESTs could be entry points for the NNA-process. Therefore, such programmes can be used to foster the further development and application of the NNA-tool. Some of these programmes are for instance:

- ***Framework Convention on Climate Change***: participating countries are to prepare their national action plan regarding the abatement of climate change. Type 3 NNAs focused on identification of EST opportunities for abatement of climate change and related capacity building actions can in principle be used for the preparation of such national action plans.
- ***Cleaner Production Programme***: international organisations (in particular UNIDO and UNEP) and national donor agencies (such as USAID, NORADD, DANIDA etc.) are establishing national cleaner production centres in developing countries. Type 3 NNAs focused on the identification of EST-needs and -opportunities in the (small scale) manufacturing industry and related capacity building needs can in principle be used to develop and diversify the activities of these centres.
- ***International programmes for management of regional ecosystems***: several types of programmes (like GEF, EROS 2000 etc.), focus on the management of regional - aquatic - ecosystems (Black Sea, Baltic Sea, Danube etc.). Type 2 NNAs focused on the identification of EST-opportunities to protect these regional ecosystems and related capacity building actions can be used to prepare activity plans within these programmes.
- ***bilateral agreements*** on development assistance to support the transition to sustainable development (such as the bilateral sustainability agreements between The Netherlands and Costa Rica, Bhutan and Benin); within the framework of such agreements, type 2 NNAs can be used to prepare activity plans.
- ***Convention on Biological Diversity (CBD)***: parties to the convention are to prepare national assessments of biodiversity resources and national action plans, whereas the CBD secretariat is to produce for consideration by the subsidiary body on science, technical and technological advice documents that take into account ways and means to promote and facilitate access to, and transfer and development of, technology as envisioned in articles 16 and 18 of the Convention. Such documents are to develop and overview relevant existing mechanisms and activities, as well as identify unmet needs of parties, with respect to technology transfer. Type 3 NNA can be used to identify and consider EST-opportunities, including applications of biotechnology and enabling roles of capacity building, to conserve and sustainable develop natural biodiversity resources.

3.5 Expertise network

The NNA-practice may significantly benefit from the establishment of an expertise network among experienced and interested national, regional and international institutions in order to support, among others, in:

- Executing and implementing NNAs regarding ESTs in developing countries and countries in economic transition;
- Monitoring and evaluating the efficiency of NNAs for improving the utilisation of ESTs in the development process of developing countries and countries in economic transition; and

- Compiling guidelines and methodologies for NNA that have proven effective under specific conditions, for example, in the form of training kits, and disseminating them, e.g., through expert meetings, training seminars, travelling workshops etc. to national stakeholders.

4. Methodology for the execution of a NNA-process

The NNA-process has been divided in three phases, respectively (i) creating an enabling environment for NNA, (ii) assessing capacity building needs, and (iii) strengthening and developing capacities. Figure 3 lists the most important activities in each phase, as well as the expected outcome of each phase. This model of the assessment process is developed in order to facilitate the preparation and execution of different NNAs and to manage their follow-up. The NNA can be undertaken at different levels of detail, based on either comparatively-superficial analysis or comparatively-in-depth analysis of environmental problems, socio-economic conditions and technological opportunities (see also paragraph 3.3). The objectives of the particular NNA, as well as the expectations of national stakeholders and the opportunity of the initiator, as well as the organiser, to undertake follow-up activities, are crucial in defining the level of detail - and thus in turn the resource input - of the execution of the NNA.

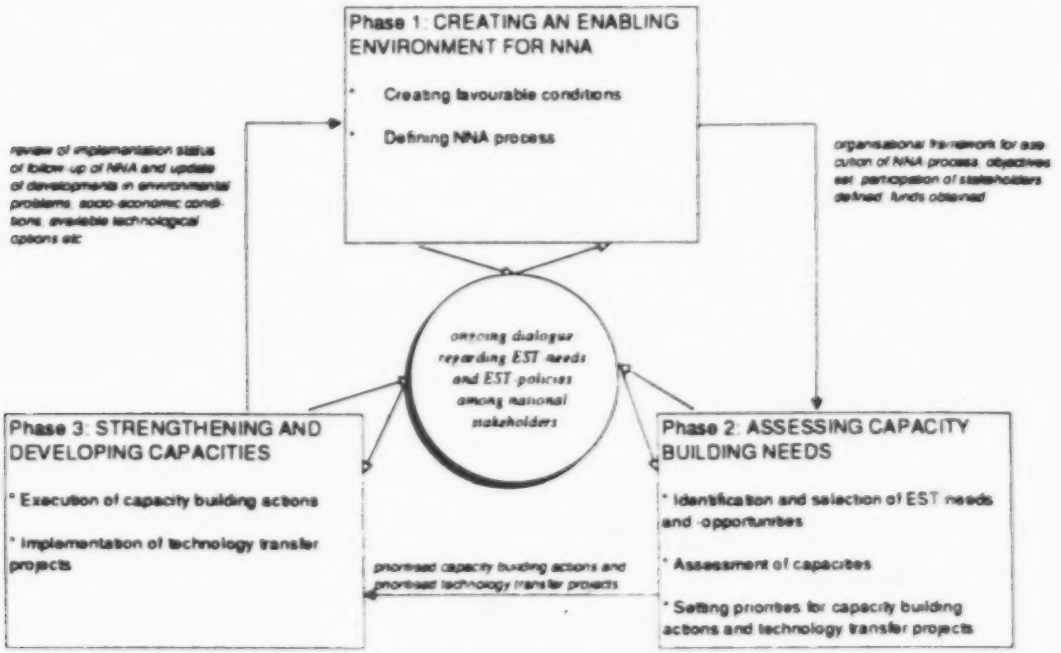
Phase 1: CREATING AN ENABLING ENVIRONMENT FOR NNA
* Creating favourable conditions
* Defining NNA process
review of implementation status of follow-up of NNA and update of developments in environmental problems, socio-economic conditions, available technological options etc
organisational framework for execution of NNA process, objectives set, participation of stakeholders defined, funds obtained
ongoing dialogue regarding EST needs and EST-policies among national stakeholders
Phase 3: STRENGTHENING AND DEVELOPING CAPACITIES
* Execution of capacity building actions
* Implementation of technology transfer projects
Phase 2: ASSESSING CAPACITY BUILDING NEEDS
* Identification and selection of EST needs and -opportunities
* Assessment of capacities
* Setting priorities for capacity building actions and technology transfer projects
prioritised capacity building actions and prioritised technology transfer projects

Figure 3: The NNA-process.

4.1 Creating an enabling environment for NNA

Creating an enabling environment for the NNA-process is important for enhancing the effectiveness of the NNA-process. It is based on two major activities, which may be undertaken simultaneously. These are:

1. ***Creating favourable conditions***: the execution of a NNA-process is only likely to be successful when favourable conditions are met in the host country. These include, among others: awareness of the socio-economic and environmental benefits of ESTs, motivation of important, national stakeholders to participate in the NNA-process (including management of its follow-up), proper qualification of the institution in charge of the execution of the NNA and availability of medium to long term national socio-economic and environmental planning;

2. ***Defining the NNA-process***: the framework for the execution of the NNA-process and implementation of its follow-up have to be set. This includes among others: setting of objectives, obtaining involvement and defining participation of national stakeholders and developing the organisational structure and workplan for the execution of the NNA. The expectations of the most important stakeholders have to be matched with each other at a realistic level, taking into account the time and finance constraints. Most important parties in this phase are national stakeholders (such as industry, government sector, research community, utility sector, NGOs, financing institutions, etc.), potential organisers and executors for the NNA and its follow-up.

Several activities may be considered in order to create favourable conditions, such as for instance:

- creating awareness of the socio-economic development potential of ESTs among national stakeholders, through among others (i) dialogue among, and with, organised stakeholders; (ii) information dissemination among general public; and (iii) implementation of demonstration projects regarding promising ESTs (practical demonstrations of the opportunities and benefits of selected ESTs at pilot sites);
- building capacity in local institutions to undertake and manage the NNA-process: most importantly the institution(s) in charge of the execution of the NNA, should have the ability to operate independently from, but respected by, most important national stakeholders, and be experienced in technology assessment and environmental planning. To this end the institutions should be well established in the target socio-economic sectors and well linked to both the government and its agencies and national stakeholders (including among others industry, NGOs and research community);
- support for medium to long term environmental and socio-economic planning: such planning may for instance result in a national development plan, a national environmental action plan or national conservation strategy, which in turn may provide a framework for the execution of the NNA-process.

Once favourable conditions have at least to a certain extent been created, the actual preparation of the NNA-process may start. Since the NNA may be undertaken in several different ways, this involves a number of strategic choices regarding objectives and scope of the NNA, selection of project partners and anticipated follow-up. In order to make informed choices, the following deserves recommendation:

- conduct a survey among stakeholders (including industry, government, NGOs, R&D community etc.) in order to identify which (policy-) initiatives are already undertaken and to take the results of these initiatives into account while defining the NNA-process;
- assure that local institutions have the ownership of the execution of the NNA;
- identify a strong, and committed, local actor to take the lead in the execution of the NNA;
- ensure participation of national stakeholders throughout the NNA-process;
- tailor the objectives of a particular NNA to long term environmental and socio-economic strategies and policies, provided that such strategies and policies are the result of a participatory process within the host country;
- make a preliminary assessment of the potential for funding of follow-up actions from resources available in the national and international, public and private sectors and tailor follow-up actions to realistic funding opportunities.

4.2 Assessing capacity building needs

In order to ensure implementation of follow-up actions, the assessment phase in the NNA-process should sustain, and possibly even increase, the awareness and commitment of national stakeholders and contribute to institutional capacity building. This cannot be done through a blue print approach; the approach should be adapted to nationally and internationally available information sources, match to socio-economic conditions, use existing networking structures and technical and organisational capacities. In general, the assessment phase should include three main assessment tasks, respectively:

1. ***Identification and selection of EST-needs and -opportunities***: inventory of technological options to alleviate environmental problems and preliminary evaluation of those options on economic, technical, cultural and environmental impacts in order to select the most promising technological options;
2. ***Assessment of capacities:*** assessment of the barriers and incentives regarding the application of the ESTs and formulation of capacity building needs; and

3. ***Setting priorities for capacity building actions and technology transfer projects***: comparative evaluation of capacity building needs and prioritisation of follow-up actions (including both capacity building actions and technology transfer projects).

Each task can be undertaken at different levels of detail; depending on the available resources and the expected follow-up for the NNA, a choice can be made between comparatively-superficial analysis tools (based on preliminary analysis of readily-available data) and comparatively-in-depth analysis tools (based on in-depth analysis of readily-available data and newly collected information). Furthermore, each task can in principle be undertaken at either ***micro-scale*** (at the level of individual enterprises, households, farmers, etc.), ***meso-scale*** (at the level of communities, industry sectors, etc.) and ***macro-scale*** (at the national level). It is well possible to undertake the different tasks at different scales: the identification and selection of EST-needs and -opportunities may for instance be based on plant level audits in representative industries (micro-level), while assessment of capacities is based on both the plant level assessment of the absorption potential for ESTs (micro-level) and assessment of the strengths and weaknesses of the environmental activities of industry associations etc. (meso-level) and setting of priorities for follow-up actions is undertaken in a roundtable-process with national stakeholders and government representatives (macro-level).

4.2.1 Identification and selection of EST-needs and -opportunities

The execution of the first assessment task encompasses both an inventory of ESTs and the selection of those ESTs relevant in light of the objectives of the NNA.

The *inventory* is to be based on the results of the following three inter-related surveys:

- ***Survey of environmental problems:*** covering target national or regional environmental problems (including inefficient use of resources) and anticipated developments therein;
- ***Survey of socio-economic conditions:*** covering socio-economic conditions under which the target socio-economic sectors are operating and - whenever feasible - the anticipated developments in socio-economic conditions; and
- ***Survey of appropriate technological options:*** covering appropriate technological options to reduce a particular environmental problem caused by a particular socio-economic sector.

The surveys can be undertaken simultaneously or consecutively. In the later case, the sequence should start with either the survey of environmental problems or the survey of socio-economic conditions, since starting with the survey of appropriate technological options would result in a technology-supply-driven bias in the identification of EST-opportunities.

With a view to identifying the most appropriate EST-needs and -opportunities, the *selection process*, should take into consideration:

- The perceived societal goals, which could determine the choice between an environmental approach (starting with the survey of environmental problems and opportunities and giving first priority to environmental impact) or socio-economic approach (starting with the survey of socio-economic conditions and giving first priority to socio-economic development);
- Potential for using locally-available resources, technologies and craftsmanship;
- Openness to emerging environmental technologies;
- Potential for win-win solutions;
- Potential for overcoming institutional and/or cultural barriers to sustainable development; and
- Costs of technological options.

Although 'inventory' and 'selection' are two distinct functions in this assessment task, it is most practical to merge both functions. To this end, the three constituent surveys are undertaken consecutively (instead of simultaneously). Upon completion of each constituent survey, a selection is made in order to gradually focus on the most promising EST-opportunities and most pressing EST-needs. As a matter of fact, this can be interpreted as placing a filter (or screen) between subsequent surveys; only the most important issues will be passed on to the next survey. The screen following the survey of environmental problems prioritises on environmental impact, whereas the screens following the survey of socio-economic conditions and survey of technological options prioritise on respectively importance of socio-economic conditions/developments and technical/economical feasibility. This integrated inventory and selection process is illustrated in figure 4.

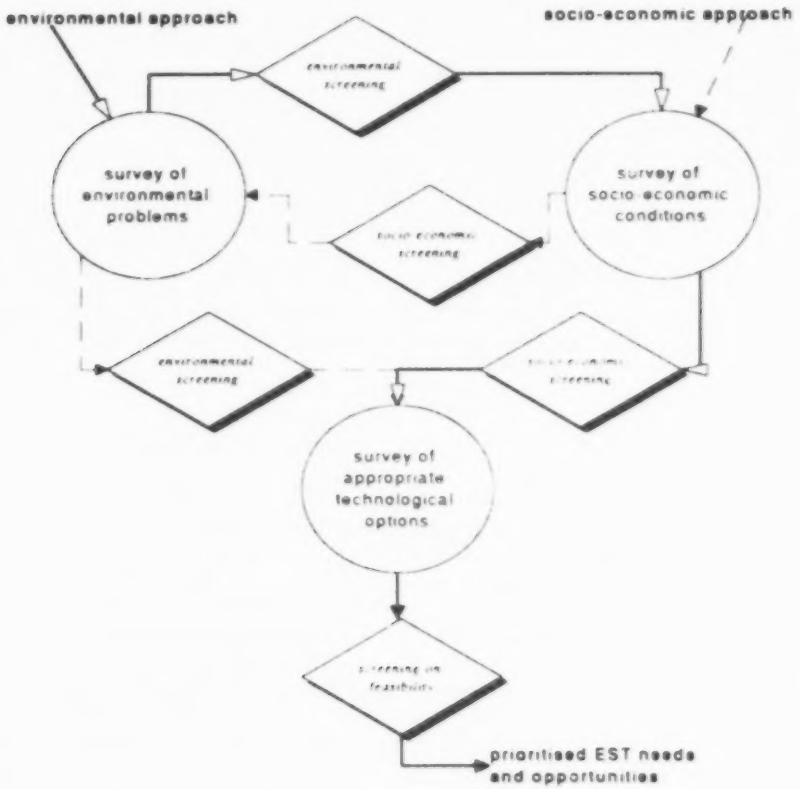

Figure 4: Schematic presentation of the identification and selection of EST-needs and -opportunities.

4.2.2 Assessment of capacities

The execution of this second assessment task encompasses both the assessment of capacities to promote and apply the prioritised EST-options, and the identification of capacity building needs regarding these prioritised ESTs.

The present functioning of key capacities for the development, adaptation and implementation of prioritised ESTs is to be evaluated. This assessment should concentrate on:

1. ***technological capacities:*** ability to develop, test, manufacture, operate and evaluate technical installations;
2. ***training capacities:*** ability to develop, deliver and evaluate training, education and extension work to relevant target groups within society;
3. ***institutional capacities:*** ability to network and co-operate among different stakeholders (including financial institutions, private sector, NGOs, etc.); and
4. ***government capacities:*** ability to prepare and implement policies, develop enforcement strategies, etc.

Whether and how the present status of these capacities affects the use of prioritised ESTs is to be characterised in a number or strong and weak points. The comparative analysis of these strong and weak points is to be used to generate an inventory of capacity building needs. Preferably this identification of capacity building needs is undertaken with participation, or at least active consultation, of the most involved stakeholders.

4.2.3 Setting priorities for capacity building actions and technology transfer projects

The third assessment task uses this inventory of capacity building needs as the starting point and aims to arrive at priority capacity building actions and priority technology transfer projects. This requires, first of all, the elaboration of the capacity building needs in 'ideas' for capacity building actions and technology transfer projects. These project ideas make the capacity building needs more practical, by explaining the relation between the capacity building need on one hand and the environmental problems and socio-economic conditions on the other hand, by proposing specific project activities to be undertaken to create the required capacities and by indicating who may execute, fund and benefit from these project activities, both on the short and the long term. The elaboration of capacity building needs into such project ideas is also instrumental in generating commitment among national stakeholders and safeguarding a proper follow-up of the NNA. Once the list of project ideas has been completed, a comparative evaluation of these project ideas should take place. It deserves recommendation to evaluate the project ideas at least with respect to:

- ***anticipated contribution to socio-economic development***: to what extent do the project activities contribute to socio-economic development ?
- ***anticipated contribution to environmental improvement***: to what extent do the project activities contribute to a reduction of prioritised national environmental problems ? and
- ***anticipated commitment of national stakeholders***: to what extent are national stakeholders in the host country committed to undertake, and possibly, co-finance the project activities ?

The comparative evaluation of the project ideas is then to result in the selection of priority capacity building actions and priority technology transfer projects. In order to enhance the effectiveness of the NNA-process, it is of utmost importance that this comparative evaluation reflects a reasonably balanced compromise of the different views of the most involved national stakeholders and that the prioritised capacity building actions and technology transfer projects are compatible with national policies.

4.3 Strengthening and developing capacities

This implementation and review phase in the NNA-process aims at (i) the planned and co-ordinated implementation of prioritised technology transfer projects and execution of prioritised capacity building actions; and (ii) the continuation of the dialogue on EST-needs and EST-policies between national stakeholders and the government and its agencies. This in turn should spur the further development, acquisition/transfer, use and diffusion of ESTs. In order to ensure the effective utilisation of ESTs in the development process of the host country, a mechanism is established for the periodic review of the implementation status, results and experiences of the prioritised capacity building actions and technology transfer projects. This periodic review may iterate a next cycle in the NNA-process and thus keeps the process evolving from alternatively 'assessing capacity building needs' to 'building prioritise[d] capacities', to 'assessing capacity building needs' etc..

The proper execution of this phase of the NNA-process calls for concerted action among key players, including national government of the host country and its agencies, other organised national stakeholders, beneficiaries of prioritised capacity building actions and technology transfer projects, donor agencies, national and international private sector and national NGOs. First of all, the participants involved in the NNA-process, elaborate the prioritised project ideas for capacity building and technology transfer into more detailed project proposals, which in turn should facilitate fund raising in the national and international public and private sectors. Next, the government of the host country is to take in association with major stakeholders, the lead in the management and co-ordinated implementation of technology transfer projects and execution of capacity building actions. This includes amongst others:

- initiation of prioritised capacity building actions and supervision of prioritised technology transfer projects;
- co-ordination with domestic and foreign private and public financing institutions and donor agencies; and
- preparation, implementation and enforcement of policies that foster the use of ESTs by different socio-economic sectors in society.

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5 Closing remarks

In addition to, and support of, ongoing technology transfer projects regarding Environmentally Sound Technologies (ESTs), National Needs Assessments (NNAs) may be undertaken to discover less obvious EST-opportunities, which upon implementation will contribute to both socio-economic development and environmental improvement. The ultimate objective of a NNA is to initiate and implement a selected number of priority projects in capacity-building regarding ESTs and transfer of prioritised EST-options.

A number of issues influence the application of NNAs regarding the utilisation of ESTs in developing countries and countries in economic transition. These include:

- *conceptual and technological issues*: regarding differences in interpretation and expectations towards ESTs, NNAs and their target group and the role of stakeholders in the NNA-process;
- *methodological issues*: regarding the question of how to manage each phase in the NNA-process (as specified in figure 3) and how to execute each assessment task (as introduced in paragraphs 4.2.1-4.2.3);
- *strategic and organisational issues*: regarding favourable approaches in planning NNAs and obtaining involvement from national stakeholders, national government and financing institutions in both the further use of NNAs and in the expansion of policies and investments in technology transfer regarding ESTs..

The framework presented here as well as the insight gained from the evaluation study and from the Expert Meeting, contribute significantly to clarifying these issues. However, further experimentation with NNAs and evaluation of their impact on the actual development of capacities and transfer of ESTs in developing countries and countries in economic transition is needed to further deepen the insight in favourable approaches to NNAs.

The success of conducting a NNA appears to depend heavily on a series of success factors, including at least (in random order):

- ***qualification of the institution in charge of the assessment***: as execution of the NNA is a process of networking and dialogue, the institution in charge should have the ability and authority to operate independently from, but respected by, the most important parties involved (including national government, financier, industry and R&D community). Preferably the institution in charge has experience in technology assessment, environmental and/or socio-economic planning and is used to work with both national consultants and international experts in order to complete specialised sub-tasks within the NNA;
- ***commitment of the national government***: this commitment is preferably reflected in socio-economic and environmental long term planning and in assigning the responsibility for the co-ordinated implementation and review of follow-up projects to a high-level body with participation of most involved national stakeholders;
- ***commitment of the organiser (or financier)***: this commitment is preferably reflected in efforts to safeguard the transparency and consistency of the NNA-process, without interfering with the content of the NNA-process (in order to avoid a supply-or finance-driven bias), and a sincere commitment to assist in fund raising for execution of prioritised capacity building actions and implementation of prioritised technology transfer projects;
- ***participation of stakeholders throughout the process of preparation and execution of the NNA-process and management of its follow-up***: participation of a variety of stakeholders, each preferably represented by at least a few institutions, appears crucial in order (i) to contribute to consensus building regarding priority capacity building actions and priority technology transfer projects; and (ii) in assuring that the 'needs' identified do not just cater to 'wishes' of a few individuals or mandate of one institution. True participation requires time to allow stakeholders to become involved and formulate their needs and views. Once the NNA-process is designed and planned in consultation with important stakeholders, it is most likely that the stakeholders will actually participate in the execution of the NNA and management of its follow-up;
- ***transparency in approach and methodology***: transparency in the approach and methodology adopted greatly enhances the consensus-building potential of the NNA (among national stakeholders) and may facilitate fund-raising for execution of prioritised capacity building actions and implementation of prioritised technology transfer projects. Transparency is especially needed with regard to priority setting between technological options, priority setting among environmental problems and priority setting regarding options for capacity building and technology transfer;
- ***ability to generate new insights***: the dialogue which is to be initiated and strengthened through the NNA-process, is most likely to have a long lasting impact, if new insights are presented and/or generated. The NNA should therefore have an in-build ability to generate new insights, for instance by making a highly innovative

identification and selection of EST-needs and -opportunities, conducting in-depth environmental and/or socio-economic examinations in pilot settings, considering innovative policy instruments etc.;

- ***ability to provide proper, and timely, follow-up to the NNA:*** the NNA-process is to create momentum for building capacity regarding the uptake of ESTs. Such momentum is easily lost, in case of a delay and/or inappropriate match of the follow-up for the NNA.

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Background document

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CROSS-SECTORAL ISSUES, WITH PARTICULAR REFERENCE TO THE CRITICAL ELEMENTS OF SUSTAINABILITY

Letter dated 18 April 1996 from the Permanent Representative of the Netherlands to the United Nations addressed to the Secretary-General

The Permanent Mission of the Kingdom of the Netherlands has the honour to submit to you the Chairman's summary of an international conference on the theme: "Sustainable industrial development: sharing responsibilities in a competitive world" (Amsterdam, 22 and 23 February 1996). The conference was jointly organized by the Government of the Netherlands, the Netherlands Confederation of Industry and Employers, the Commission of the European Communities, the Organisation for Economic Cooperation and Development and the United Nations.

The objective of the conference was to formulate recommendations and conclusions on the subject of sustainable industrial development. These were derived from a number of group discussions involving key decision makers from both Governments and business, as well as from various international organizations.

I would be grateful if you could make arrangements to circulate the attached summary as an official document of the Commission on Sustainable Development at its fourth session. The full Chairman's report and the conference paper will be made available at the high-level segment of the session on 1 May 1996.

(Signed) N. H. BIEGMAN
Ambassador
Permanent Representative

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Annex

CHAIRMAN'S SUMMARY OF AN INTERNATIONAL CONFERENCE ON THE THEME "SUSTAINABLE INDUSTRIAL DEVELOPMENT: SHARING RESPONSIBILITIES IN A COMPETITIVE WORLD"

Inspired by a number of excellent keynote addresses and the conference paper of Arthur D. Little, participants engaged in very thorough discussions on a broad range of topics.

The conference embraced the concept of eco-efficiency as a central objective of sustainable industrial development. However, it was stressed that improving eco-efficiency involves more than just developing and applying new technology. It is equally important to find new ways of doing business by linking together different industries; to set up joint ventures between public utilities and private industries; and to establish financial structures that will ensure a fair distribution of costs and benefits in combining efforts to improve eco-efficiency. Moreover, emphasizing the importance of institutional approaches for economic efficiency is very much in phase with modern concepts in economic theory.

There was a general agreement that, in view of the increasing complexity of environmental and economic issues, sustainable industrial development requires more cooperative approaches on the part of Governments and business, with due regard for their respective responsibilities. Much emphasis has been placed on the use of negotiated agreements as a framework for partnerships between the public and private sectors. The Netherlands experience with that approach was seen by many as a kind of model that has proved to be very successful. However, adopting such an approach is a gradual process that requires certain experience and conditions at each stage before the next steps can be taken. In particular:

(a) One should recognize that partnership approaches are likely to be more effective when environmental policies have matured beyond a level of basic regulations;

(b) Societal support for and commitment to negotiated cooperative approaches is more likely to be achieved in a proactive climate based on a high awareness and sense of urgency about fundamental environmental problems;

(c) It is equally important that cooperative approaches seek counterparts in the business community who are convinced that long-term company goals coincide with improvement in environmental performance, and that such conviction be demonstrated by company mission statements and management approaches;

(d) Negotiated agreements must be backed up by adequate arrangements to counteract potential free-rider problems.

In addition, the conference made it clear that for negotiated agreements to be successful they must:

(a) Be based on mutual trust and fairness;

(b) Aim for ambitious but feasible targets;

(c) Offer mutual benefits beyond and above those offered by direct regulatory approaches;

(d) Provide for appropriate performance indicators to ensure public transparency and accountability.

Agreement on how to measure performance and progress is particularly important in order to ensure credibility in the eyes of parliament and third parties not directly involved in negotiating agreements.

One should be aware that sustainable industrial development is considered with a certain mistrust by outsiders because of perceived trade-offs with competing social needs.

In addition, implementing sustainable industrial development calls for a specific approach in each country, depending on the stage of development of its environmental policies and its specific institutional conditions, as well as business-related investment policies.

The success of the sustainable industrial development concept does not automatically solve the debate about market-based instruments. On the contrary:

(a) There are conflicting views on the potential efficacy of market-based incentives as cost internalizing mechanisms, as well as on the political and economic problems involved;

(b) The lack of broad actual experience with such concepts and instruments as eco-taxes and tradeable permits makes them difficult to understand for policy makers, business people and the public at large (consumers). Therefore, there is a need for a clearer view and a gradual intensification of the use of financial instruments at the national and international levels;

(c) Incentives (subsidies) can be useful, in the framework of sustainable industrial development, to provoke learning curves when applying new technologies. However, such subsidies should be temporary. Prestige (e.g., awards) can also play a positive role in the sustainable industrial development concept.

Special attention should be paid to the improvement of environmental management capabilities by small and medium enterprises (SMEs). In particular, the conference stressed the need to:

(a) Facilitate and stimulate the transfer of technology and managerial experience to SMEs;

(b) Stimulate sharing of environmental expertise and capital intensive technology among SMEs;

(c) Utilize supplier contracts as a vehicle for improving SME environmental performance.

Eco-efficiency requires more cooperative approaches at the international level (e.g., the European Union). The conference noted that the implementation of sustainable industrial development policies will have some impact on free trade and free competition. It was felt that in such cases, eco-efficiency measures should not be obstructed but ways and means must be found to make trade and competition rules more compatible with cooperative approaches.

Multinational companies have an important role to play in the international transfer and application of advanced environmental techniques by maintaining the principle of best practice in all their facilities.

Financial institutions, such as banks and insurance companies, can play a prominent role in enhancing sustainable industrial development if they make sound environmental management an integral part of their assessment criteria for good business, in accordance with the Porter hypothesis that economically sustainable businesses are eco-efficient businesses.

In conclusion, the Chairman wishes to thank all participants for their very constructive contributions. They demonstrated that the issue of sustainable industrial development will be crucial for developing and doing business in the years to come. I am sure that they will join me in my appeal to the international community to be ambitious and innovative in its efforts to maintain the carrying capacity of the globe on which we must all live together.